WORLD BANK NEWS

Special Issue May 1992

Special Report:

The World Bank

The Environment

And Development

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THE WORLD BANK

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Special Report: Environment and Development

This special issue of *World Bank News* focuses on the World Bank's role in protecting the environment and helping its member countries incorporate environmental concerns into economic decisionmaking.

The issue includes articles that provide background information about the Bank and key issues of environment and development. It also includes some stories that have appeared in previous issues of the newsletter.

This issue attempts to provide some insight into how the World Bank works and what it is doing to preserve rapidly disappearing natural resources and to help the people of the developing world build better lives for themselves.

Environmental Activities

Several offices share responsibility for the Bank's environmental work.

The Environment Department, which is part of the Bank's Sector and Operations Policy Vice Presidency, is in charge of formulating policies, carrying out research, developing guidelines for environmentally sound development programs, and training staff. The department is also in charge of administering the Global Environment Facility on behalf of the main institutional sponsors: the World Bank, the United Nations Development Programme, and the U.N. Environment Programme.

The Bank's lending activities are carried out by six regional vice presidencies, each of which has an environmental unit in charge of making sure development projects meet environmental standards set by the Bank and the borrowing countries.

Other areas of the Bank also carry out environmental research and develop guidelines for environmentally sound development in particular sectors of the economy. For example, the Bank's Agriculture and Rural Development Department conducts research and draws up recommendations for environmentally sound farming methods in the developing world. □

Preston Calls for Commitment to Earth Summit Objectives

World Bank President Lewis Preston urged finance ministers meeting in Washington on April 28 to work toward a successful outcome of the forthcoming Earth Summit in Rio de Janeiro.

In an address to the Development Committee, which brings together ministers from industrialized and developing countries, Mr. Preston said that it was time to put aside the "wrangling over who is to blame for environmental degradation and what it will cost and who should pay to reverse it." Instead, he said, "it is time to get on with a serious commitment by all parties concerned to preserve the planet using all the human, institutional and financial resources we can muster."

Meeting national environmental challenges in developing countries, Mr. Preston said, will require governments to carry out economic policy reforms aimed at discouraging waste of resources. But the World Bank president warned that the developing countries cannot meet environmental goals by themselves and called on the international community to step up its financial support for environmentally sound development programs in the poorer countries.

Lewis Preston

"Many of these resources will have to come from external sources and will have to be supplied on concessional terms," Mr. Preston said. "Principal reliance should be placed on existing development institutions with a proven track record in promoting development, reducing poverty, and protecting the environment."

Mr. Preston said the Bank's concessionary-lending affiliate, the International Development Agency (IDA), is well placed to integrate environmental concerns into the full range of development objectives. "There is a strong case for providing IDA with additional annual funding to enable it to increase its assistance to help recipients meet their national environmental objectives," he said, calling for an "earth increment" in addition to the next replenishment of IDA's lending base.

Turning to environmental problems that transcend national boundaries, Mr. Preston said that here, too, reliance should be placed on existing institutions. "The experience of the Global Environmental Facility (GEF) to date shows that it has been able to develop well-conceived projects and approve funding for them in a pragmatic and expeditious manner." □

Sustainable Development

The term "sustainable development" was brought into common use by the World Commission on Environment and Development (the Brundtland Commission) in its seminal 1987 report *Our Common Future*. The idea of sustaining the earth has proved a powerful metaphor in raising public awareness and focusing on the need for better environmental stewardship.

The Brundtland Commission's definition of the term--"meeting the needs of the present generation without compromising the needs of future generations"--is strongly endorsed by this report. We also believe, with the Brundtland Commission, that meeting the needs of the poor in this generation is an essential aspect of sustainably meeting the needs of the poor in this generation is an essential aspect of sustainably meeting the needs of subsequent generations. There is no difference between the goals of development policy and appropriate environmental protection. Both must be designed to improve welfare.

Making the concept of sustainability precise, however, has proved difficult. It is not plausible to argue that all natural resources should be preserved. Successful development will inevitably involve some amount of land clearing, oil drilling, river damming, and swamp draining. Some have argued that natural capital should be preserved in some aggregate sense, with losses in one area replenished elsewhere. This approach has helpfully focused attention on the need to estimate the value of environmental resources and on the importance of protecting certain essential ecological systems.

This report supports efforts to assess values but goes further. Societies may choose to accumulate human capital (through education and technological advance) or man-made physical capital in exchange, for example, for running down their mineral reserves or converting one form of land use to another. What matters is that the overall productivity of the accumulated capital--including its impact on human health and aesthetic pleasure, as well as on incomes--more than compensates for any loss from depletion of natural capital. In the past the benefits from human activity have often been exaggerated, and the costs of environmental loss have been ignored. These costs must be built into decisionmaking, and all short- and long-term impacts must be carefully explored. This cannot be done without taking account of the uncertainties and irreversibilites associated with some environmental processes, recognizing that some environmental benefits come in intangible forms and that some impacts occur far into the future. Not all environmental resources can or should be assigned monetary values but tradeoffs should be made as explicit as possible.

It is sometimes argued that the benefits from human investment are temporary, while the benefits of an undisturbed environment last forever. This has prompted some to advocate using a lower discount rate in project analysis. But this may lead to more damage (through encouraging investment) rather than less. The answer lies not in artificially lowered discount rates but in ensuring that the benefits from an expanding economy are reinvested.

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Earth Summit Will Set Environmental Agenda

The United Nations Conference on Environment and Development, or "Earth Summit," will take place in Rio de Janeiro June 3-14. In an interview with World Bank News, *Jane Pratt, chief of the office in charge of the World Bank's involvement in the summit, says the international community will soon have a global environmental agenda for the 21st century.*

WBN: Who initiated the summit, and how did the World Bank get involved?

Ms. Pratt: The U.N. General Assembly passed a resolution in February 1990 to hold an international conference on environment and development.

The conference marks the 20th anniversary of a U.N. conference on people and the environment that took place in Stockholm. During that conference, the United Nations Environment Programme was established.

But the United Nations also wanted to hold the conference to address environmental issues raised in the 1987 report of the Brundtland Commission. The report stated the need to promote sustainable development, or environmentally sound economic development.

I'd like to see the international community begin combining environmental issues with all economic development programs.

Former World Bank President Barber Conable was a strong supporter of sustainable development, so he pledged the institution's support in preparing the summit.

WBN: The fourth major meeting to prepare for the summit has just been completed. What took place during these meetings?

Ms. Pratt: The purpose of these meetings was to prepare all the documents and declarations that will be finalized at the summit in June.

An important document produced during the preparatory meetings is a declaration of principles for environmentally sound development. Governments will use these principles as a basis for negotiations on future environmental conventions and as a guide in setting agendas for protecting the environment in a way that is compatible with economic development. The declaration will be presented during the summit for adoption and agreement by heads of state and governments.

WBN: What was the most important document produced during the preparatory meetings?

Ms. Pratt: The four meetings of the preparatory committee--or the so-called Prepcomms--that took place over a two-year period produced something called Agenda 21, which is an agreement on specific actions to be taken by governments and international agencies from now and into the 21st century.

The agenda includes 115 different environmental programs covering issues ranging from storage and shipment of hazardous wastes to managing limited water supplies.

The Prepcomms have also written up proposals for transferring technologies to developing countries to support the implementation of Agenda 21, setting up governmental and international institutions that will be in charge of environmental activities, and for covering the costs of environmental protection.

WBN: What role has the World Bank played so far?

Ms. Pratt: The Bank, which will participate in the summit as an observer, has been heavily involved in developing proposals in areas of development where it has an expertise. These areas include sustainable agricultural development, water-resource management, and urban development, among many other issues.

WBN: What is the most important outcome of the preparatory meetings to date from the Bank's point of view?

Ms. Pratt: The learning experience. The preparatory meetings brought together people from vastly different countries, cultures, and constituencies to forge common views on environment and development. These people included delegates from U.N. member governments and agencies, as well as representatives from non-governmental organizations, the business, scientific and technical communities, spiritual leaders and indigenous and tribal groups.

Jane Pratt

The Bank has reaped immediate benefits from these meetings because it has started incorporating these views into the institution's work long before the summit begins.

WBN: What will happen at the summit?

Ms. Pratt: There are likely to be frantic negotiations to finalize all of the documents produced during the preparatory meetings. International conventions will be adopted, governments will have a chance to show their commitment to sustainable development, and the international community will gain an agenda for environmental action.

WBN: Are there any issues that are likely to provoke especially intense debate at the summit?

Ms. Pratt: Yes, forests and financing. There is still a lot of disagreement over the extent to which tropical forests must be protected. And, there will be a lot of discussion over who will pay--and how much--for carrying out Agenda 21.

WBN: What will the summit achieve?

Ms. Pratt: I would like to see a new environmental vision for the planet, and I'd like to see the international community begin combining environmental issues with all economic development programs.

I expect that any agreements reached during the conference will not change the global environment overnight. Goals will be met in stages, with each agency or government playing an important role in areas appropriate to its expertise and mandate. The individual patches of the overall design will have been produced. □

El-Ashry: Reducing Poverty and Protecting the Environment Go Hand-in-Hand

Environmental degradation in developing countries has been linked to widespread poverty, which forces millions of people to exploit the land to eke out a living. Mohamed El-Ashry, director of the World Bank's Environment Department and chairman of the Global Environment Facility, said at an environmental conference in Japan in March that protecting the environment will require the international community to join forces in improving living standards in the poor countries. The following are excerpts from a speech that he delivered at the conference.

Economic development remains the greatest challenge facing humanity. Despite unprecedented economic and social progress made over the last generation, large areas of poverty persist and concern has now arisen as to whether environmental constraints will add yet another impediment to development.

In far too many places, the air is polluted, the rivers poisoned, the land degraded, the forests denuded, and the growth of population inexorable.

At the same time, the need for economic development is clear. More than 1 billion people live on less than one dollar a day. Today's struggle for survival all too often spells tomorrow's degradation.

The need for environmental protection is equally clear. A degraded environment spells a degraded standard of living. Environmental protection is an integral part of improving living conditions--especially in developing countries, but in industrial countries as well.

The World Bank is a development agency. Our mission is to help encourage sustainable economic development and reduce poverty. But in recent years, the reciprocal relationship between economic performance and environmental protection has become indisputable. To this extent, the World Bank must also be an environmental agency.

Developing countries are rightly concerned about their own development, and have special interest in maintaining and enhancing their natural resource base, which is the source of much of their prosperity. Many of them are conscious of the fact that the richer countries have been the major source of global environmental damage, and, after having already developed, are attending belatedly to the harmful consequences of their own industrialization.

Developing countries are also wary of the consequences of applying strict environmental standards that could restrain their development efforts, thus adding yet another hurdle to their fight against underdevelopment. Yet, it is the projected population growth and economic expansion in the developing countries that is likely to be the major source of incremental stress on their own environment as well as globally.

Mohamed El-Ashry

The most practical mechanism for handling global problems is through international cooperation and multilateral agreements between nations.

Many developing countries are realizing that care for natural resource management and the environment generally is to their advantage and that environmental maintenance needs to be universal and internationally coordinated since the world has become too small for independent approaches. The responsibility for a better environmental future must, therefore, be shared by developing and developed countries alike.

Because of the intimate connections between poverty and environmental degradation, efforts to combat poverty in developing countries--a major objective of all development--must increasingly be linked to maintaining environmental capital, curtailing population growth, raising the levels of education and the status of women, and especially targeting the deleterious impact of environmental degradation on the health and welfare of the poor.

Improving the environment of developing countries must not be seen as a concern only for them, but equally as a global concern that affects all countries.

Most of the efforts to protect, maintain, and repair the environment are country-focused and should fall within the development perspective of national policies. But there exists also transboundary effects that fall outside national perspectives. Global warming and ozone depletion are good examples. The most practical mechanism for handling global problems is through international cooperation and multilateral agreements between nations.

The World Bank has taken a number of significant steps over the past few years to integrate environmental concerns into its work, and this trend will be maintained and greatly strengthened.

As a contribution to the United Nations Conference on Environment and Development, or "Earth Summit" which will be held in June, the World Bank has devoted its *World Development Report 1992* to the topic of development and the environment.

The Bank has recently issued new and strengthened guidelines for environmental impact assessments, which make certain that such impacts are identified early during project preparation, discussed with affected groups, and counteracted by measures within the design of the projects concerned.

Because of the close links between hu-

See **EL-ASHRY**, *page 6*

El-Ashry: Bank Strives to Integrate Environment and Development Work

EL-ASHRY, *from page 5*

man-resource development and the environment, environmental issues will be increasingly integrated into poverty-alleviation measures, family planning and health and education initiatives.

The Bank has also adopted policies for involuntary resettlement, dams and reservoirs, wildlands, and forest conservation and management, and is preparing a comprehensive policy paper on water-resource management.

A major task remaining to be done within the Bank is the further integration of the environment into country economic work.

It is clear that substantial investments are needed not only for meeting the costs of environmentally sustainable development, but also to protect water supplies, to avoid soil degradation, to control pollution in the energy sector, to slow down deforestation, and to protect coastal zones. The developing countries face great difficulties in meeting these costs. It is highly probable that decisions will be made at the Earth Summit in Rio de Janeiro in June to proceed with some new funding initiatives.

Continued strong financial support for the International Development Association (IDA) will be essential. The crucial role of this affiliate of the World Bank in assisting countries to reduce poverty, and the close links between poverty reduction and environmental protection argue for such support. The national environmental priorities of developing countries would be best assisted by a commitment emanating from the Earth Summit to provide adequate support to recipients for the pursuit of the entire range of their sustainable development objectives. Aside from public institutions like the World Bank, two other groups also have a special contribution to make in the sustainable development process. These are the private sector and non-governmental organizations.

The goal of reducing global environmental risks, alleviating poverty, and making sustainability a global reality requires unprecedented international cooperation among governmental, non-governmental, private sector and intergovernmental entities. The Earth Summit offers the world a chance to move beyond rhetoric to real action on international cooperation for sustainable development.

Governments and international institutions must demonstrate that they are irrevocably committed to the principle of sustainable development--the principle that poverty reduction, a better quality of life, and a healthy environment are compatible. □

Lending for Environmental Protection Projects Quadrupled in Fiscal 1991

The World Bank has continued to integrate environmental concerns into its operations, with $1.6 billion in lending for projects that focused on environmental protection in fiscal 1991, according to *The World Bank and the Environment: A Progress Report, Fiscal 1991*, published last October.

The Bank's fiscal 1991 began July 1, 1990 and ended June 30, 1991.

In the previous fiscal year, the Bank had approved $404 million for environmental projects.

In fiscal 1991, the Bank also approved many projects that did not focus on environmental protection but included environmental protection measures. About four of every 10 projects approved in fiscal 1991 had significant environmental components.

To step up its environmental work, the Bank has increased staff time to address environmental issues in development. Overall, about 270 staff-years were devoted to forestry or environment in fiscal 1991, corresponding to about 10 percent of total Bank staff time.

"The World Bank has continued to make significant progress in its environmental work," according to Mohamed El-Ashry, the Director of the Environment Department. "We must now focus on implementation to demonstrate how practical solutions can be found to some of the most complex environmental issues of our time," he said.

A major initiative by the Bank during fiscal 1991 included the launching of the Global Environment Facility (GEF). The GEF is a three-year pilot program--with initial funding of SDR 1 billion (about $1.5 billion)--which supports projects in developing countries to reduce global warming, preserve the earth's biological diversity, protect international waters, and prevent further depletion of the ozone layer. Twenty-five countries, eight of which are in the developing world, have contributed to the facility. The United Nations Environment Programme, the U.N. Development Programme, and the World Bank are jointly responsible for the GEF.

In fiscal 1991, the Bank shifted its involvement in forest activities from an emphasis on commercial ventures toward more people-oriented and conservation initiatives. In its forest policy paper, published in late 1991, the Bank pledged that it "will not under any circumstances" finance commercial logging in primary tropical moist forests.

A set of guidelines drafted in fiscal 1991 requires an "environmental assessment" for all projects that may have a significant negative impact on the environment.

The report concludes that experience gained during fiscal 1991 has reinforced several principles that have guided the Bank's environmental work. These principles include the importance of building up institutions in charge of environmental management, the necessity of public participation in environmental initiatives, and the need to consider economics in developing environmental protection programs.

The Bank's report adds that "market liberalization is a necessary condition for sound environmental--as well as economic --management. If prices do not reflect real costs," the report states, "there is no incentive to use resources efficiently and thus avoid waste." But experience has shown that "a free market is not a sufficient condition for environmental improvement," the report concludes. □

INFORMATION BRIEF

The World Bank Group

The International Bank for Reconstruction and Development, frequently called the "World Bank," was conceived in July 1944 at the United Nations Monetary and Financial Conference in Bretton Woods, New Hampshire, U.S.A. The World Bank opened for business on June 25, 1946.

The goal of the World Bank is to promote economic development that benefits poor people in developing countries. The World Bank provides loans to developing countries to help reduce poverty and to finance investments that contribute to economic growth. Investments include roads, power plants, schools, and irrigation networks, as well as activities like agricultural extension services, training for teachers, and nutrition-improvement programs for children and pregnant women. Some World Bank loans finance changes in the structure of countries' economies to make them more stable, efficient, and market oriented. The World Bank also provides "technical assistance," or expert advice, to help governments make specific sectors of their economies more efficient and relevant to national development goals.

The first loans approved by the World Bank helped finance the reconstruction of the war-ravaged economies of Western Europe. Today, the World Bank lends to the developing countries of Africa, Asia, Latin America and the Caribbean, North Africa, the Middle East and Europe.

The World Bank has three affiliated institutions: the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA). The headquarters of the World Bank and its affiliates are in Washington, D.C.

IBRD: The International Bank for Reconstruction and Development has 156 member countries. The interest rate on World Bank loans to developing countries changes every six months. The current rate is 7.73 percent. Loans generally have a five-year grace period and must be repaid during periods ranging from 15 to 20 years. In fiscal 1991, which ended on June 30, 1991 the IBRD approved loans totaling $16.4 billion for 126 economic development projects and programs designed to restructure national economies, in 42 countries. Some of the money that the IBRD lends to developing countries comes from contributions from the institution's member countries. But the majority comes from bonds issued in world financial markets.

IDA: The International Development Association, established in 1960, has 140 member countries. The World Bank affiliate provides no-interest loans to the world's poorest countries. Only countries with annual per capita incomes of less than $1,195 can borrow from IDA. However, most of IDA's loans are provided to countries with annual per capita incomes of $740 or less. IDA loans, which are known as "credits," have a 10-year grace period and must be repaid in 35 or 40 years (according to the borrowing country's creditworthiness). In fiscal 1991, IDA approved credits totaling $6.3 billion for 103 development projects and economic restructuring programs in 40 countries. The money that IDA lends comes from contributions from wealthier nations, an occasional contribution from the profits made by the IBRD, and repayments of IDA credits. Although legally separate from the World Bank, IDA shares the World Bank's staff and facilities.

IFC: The International Finance Corporation, established in 1956, has 145 member countries. It promotes economic growth in developing countries by lending directly to the private sector. Unlike the IBRD, it lends without government guarantees. The IFC may also take equity positions in companies, play the role of catalyst to other investors, and work to develop capital markets in developing countries. In fiscal 1991, IFC approved financing of $2.9 billion in 152 projects and other activities carried out by the private sector.

MIGA: The Multilateral Investment Guarantee Agency, established in 1988, has 78 member countries as of August 1991. This World Bank affiliate promotes private investment in developing countries. It provides guarantees on investments to protect investors from non-commercial risks such as war or nationalization. It also provides advisory services to governments to help them find ways to attract private investment in their countries. In fiscal 1991, MIGA issued 11 guarantees for projects in 7 developing countries having a total cost of $922 million. □

UN photo 155476/John Isaac

The World Bank provides loans to developing countries to help reduce poverty and to finance investments that contribute to economic growth.

INFORMATION BRIEF

How the World Bank Is Governed

Member countries, now numbering 156, own the Bank and govern its policies and programs. The Bank's shareholders are sovereign nations, not private investors.

These member nations encompass all forms of government and are at varying stages of economic development--from the poorest countries such as Nepal where annual per capita income is only $170 to the wealthiest countries such as Japan, where per capita income is $25,430 annually.

The Articles of Agreement

The Bank's charter, known as the Articles of Agreement, established the institution's framework.

The Articles were negotiated at a conference held in the village of Bretton Woods, New Hampshire in 1944. Forty-four countries--the largest of which were the United States, United Kingdom, France, China, India and the Soviet Union--sent representatives to Bretton Woods. Most of the nations attending the conference, except the Soviet Union, later ratified the Articles and became the Bank's first members. It was not until 1992 that the 15 republics of the former Soviet Union applied for membership.

The Articles state that only members of the IMF can become members of the World Bank. Each country is represented by a governor (usually that country's Minister of Finance or Governor of the Central Bank) and an alternate governor. Shares of capital are allocated according to a formula based on member countries' quotas in the IMF and voting is weighted in proportion to a country's shareholdings. Thus, today, the United States holds the largest percentage of votes (18.02 percent), followed by Japan (7.82 percent), Germany (6.07 percent), France (5.79 percent), and the United Kingdom (5.79 percent).

The Board of Governors

The Bank's founders provided for the conduct of the general operations of the Bank to be delegated to the Board of Executive Directors, with the President of the Bank serving as Chairman of the Board. They reserved for the Board of Governors certain other powers including the power to admit new members, increase or decrease the capital stock, or suspend a member.

Once a year, the Boards of Governors of both the IMF and the Bank meet in joint session known as the Annual Meetings. The views of individual governments, however, are represented throughout the year by the Executive Directors.

The Executive Directors

The Bank's Articles of Agreement require the Executive Directors to function in continuous session at the Bank's headquarters in Washington, D.C. and to meet as often as the business of the Bank requires. The resident nature of the Board is one of the characteristics that distinguishes it from the boards of directors of commercial corporations.

Today the Bank has 22 Executive Directors. According to the Articles of Agreement, the five largest shareholders--the United States, Japan, Germany France and the United Kingdom--each appoint one executive director. The other countries are grouped in 17 constituencies, each represented by an executive director who is elected by a country or a group of countries. The number of countries each of these 17 Directors represents varies widely. For example, the Executive Directors for Saudi Arabia and China represent one country each, while one Director speaks for 24 Francophone African countries and another Director represents 21 mainly English-speaking African countries.

The members themselves decide how they will be grouped. The country groups are more or less formed along geographic lines with some political and cultural factors playing a part in how they are constituted.

At their regular weekly sessions, the Executive Directors consider the Bank's work, including lending proposals, budgets and policy issues presented by the President, who serves as Chairman of the Board.

The Articles of Agreement spell out basic rules that govern the Bank's operations. It must lend only for productive purposes and must promote economic growth in the developing countries in which it lends. It must pay due regard to the prospects of repayment of its loans. Each loan is made to a government or must be guaranteed by the government concerned. The use of loans cannot be restricted to purchases in any particular member country. And the Bank's decisions to lend must be based on economic considerations alone.

The Management

According to a longstanding custom, the Bank's President is nominated by the Executive Director representing the United States, but selected by the Executive Directors.

The President of the Bank is responsible for its day to day management and, subject to the general control of the Executive Directors, for its organization, and for the appointment and dismissal of staff. The President heads a staff of over 8,000 employees from more than 100 countries and is assisted by three Managing Directors who oversee operations in specific areas.

The Affiliates

When the World Bank was founded, it consisted of one institution--the International Bank for Reconstruction and Development. In later years three affiliates were added.

Each affiliate was established for different purposes and each has its own charter and separate membership. The President of the IBRD is the President of each affiliate; the same Executive Directors govern the IBRD, the International Finance Corporation and the International Development Association. (The Multilateral Investment Guarantee Agency has a separate Board of Directors, most members of which are IBRD Executive Directors.) □

The following stories on pages 9 through 12 related to the **World Development Report 1992** *are embargoed for release in a.m. newspapers, Monday, May 18.*

WORLD DEVELOPMENT REPORT 1992

Today's Environmental Decline Jeopardizes Future Prosperity

Economic development and sound environmental management are complementary aspects of the same agenda, according to a new report from the World Bank. "Without adequate environmental protection, development will be undermined; without development, environmental protection will fail."

World Development Report 1992, published in Washington on May 18, describes how environmental problems can and do present obstacles to development, such as situations where the benefits of rising incomes are offset by the costs imposed on health and the quality of life by pollution. Future productivity can be jeopardized if rising incomes today result in soil degradation, depleted aquifers and destroyed ecosystems.

Alleviating poverty is a moral imperative and a prerequisite for environmental sustainability; the poor are both the main victims and among the agents of environmental damage. Rapid economic growth will be required to alleviate poverty and to lower population growth rates. However, that growth brings with it the risk of appalling environmental degradation.

The challenge, the report asserts, is to ensure that the past links between economic growth and a deteriorating environment are broken.

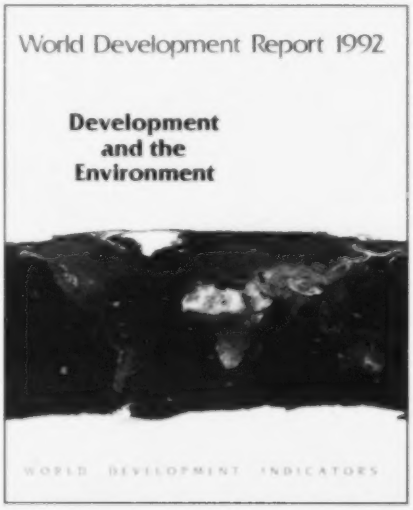
Priorities

This report seeks to identify the most serious challenges and suggests strategies for addressing them. More action should be taken to attack the environmental problems that damage the health and productivity of the largest number of people, especially the poor. Priority should be given to the one-third of the world's population that has inadequate sanitation and the 1 billion people without safe water; the 1.3 billion people who are exposed to unsafe conditions caused by soot and smoke; the 300 million to 700 million women and children who suffer from severe indoor air pollution from cooking fires; and the hundreds of million of farmers, forest dwellers and indigenous people who rely on the land and whose livelihood depends on good environmental stewardship.

Strategy

"A two-fold strategy is required," says World Bank President Lewis Preston in a foreword to the report. "First, the positive ("win-win") links between efficient income growth and the environment need to be aggressively exploited...Second, strong policies and institutions need to be put in place which cause decisionmakers--corporations, households, farmers and governments--to adopt less damaging forms of behavior."

The key to sustainable growth is not to produce less, but to produce differently, the report argues and offers solutions to a broad range of environmental problems. Specific examples of successful practices and policies are presented, along with analyses of development projects--some assisted by the World Bank-- that had unanticipated, adverse, environmental consequences.



Building on the Positive Links

Policies justified on conventional economic grounds alone can deliver substantial environmental gains, the report notes. Eliminating subsidies for energy use and water, giving poor farmers property rights to the land they tend, investing in better sanitation and water supplies are measures which can raise incomes and improve the environment.

Policies for efficient growth can complement those for environmental protection, the report observes. Improving education for girls may be the "most important" long-term environmental policy in the developing world, for example, since educated women have smaller families and are able to make better use of natural resources.

Breaking the Negative Links

Sound development policies, however, are not enough to ensure environmental quality, the report notes; strong public institutions and environmental protection policies are essential. There may be situations requiring trade-offs between income growth and protection of the environment; these call for careful assessments of the benefits and costs of alternative policies as they affect both today's population and that of the future.

"The evidence indicates that the gains from protecting the environment are often high and that the costs in foregone income are modest if appropriate policies are adopted," the report declares.

Policy reforms must focus on changing agricultural and industrial practices so as to reduce drastically the amount of pollution, wastes and other environmental damage per unit of output. Environmental impacts need to be recognized; policies aimed at changing behavior should rely heavily on economic incentives. Early action to prevent degradation will usually be much

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WDR, *from page 9*

cheaper than attempting to reverse it later.

Institutions

Policy reforms and institutional changes face formidable obstacles, the report recognizes. Interest groups will complain, public opinion will focus on the most dramatic issues rather than the most important ones and, oftentimes, the government itself is the agent of environmental damage.

Responsive and effective institutions must be developed. Information and analysis must be improved to assist setting priorities and formulating policies. Public participation, especially at the local level, is required for policymaking, monitoring and enforcement. In some cases, governments need to allocate the management of natural resources to individuals or communities and, whenever possible, they need to rely on the use of prices and taxes to encourage conservation. Often, simple but blunt policies may be preferable because they are more easily administered and enforced.

International Issues

Finding and implementing solutions to environmental problems requires a partnership of efforts among nations, the report states. Industrial countries should assist the transfer of less-polluting technologies to the developing countries. These, combined with other technical assistance, would permit developing countries to avoid the environmental degradation that accompanied industrialization in the richer countries. Further, the industrial countries must take the lead in formulating and funding solutions to problems of global concern, if action is required that goes beyond measures that are in each country's self-interest.

Additionally, the capacity of developing countries to achieve income growth with which to finance environmental improvements depends considerably on industrial-country economic policies, particularly those relating to trade and finance.

Setting priorities for global environmental policy is complex, the report notes, but international organizations have extended their areas of cooperation to include the environment. The Global Environment Facility, for example, was created recently to seek solutions to transnational environmental problems, such as global warming.

The report urges the international community to take precautionary steps to deal with this problem. While present evidence does not warrant immediate, drastic action, the report argues, modest reductions in emissions of carbon dioxide plus investment in research, development and pilot projects would enable countries to achieve more drastic reductions in emissions, should such action prove necessary.

Finance

Many investments aimed at protecting the environment will begin to pay for themselves within a few years, the report maintains, either through increased productivity or improved health and welfare. The costs of enabling countries to achieve development in an environmentally sound manner are likely to be large in absolute terms but small in relation to resources generated by economic growth. The cost of investments suggested in the report may rise to about $75 billion annually, or about 1.4 percent of developing-country gross domestic product over the present decade.

Most environmental investments and maintenance required will be undertaken by enterprises, and the extra costs will be reflected in prices paid by consumers. The choices that result will make environmentally desirable practices more profitable and attractive.

Financing these environmental investments will require an expansion of private and official capital flows to developing countries, the report states. This expanded funding should be additional to aid that would otherwise be made available.

"The present time is unprecedented in its potential for change," the report observes. The United Nations Conference on Environment and Development (UNCED)--the "Earth Summit"--in June 1992 affords an opportunity for a global commitment to environmental reform.

"The agenda for reform is a large one," the report concludes. "Accepting the challenge to accelerate development in an environmentally responsible manner will involve substantial shifts in policies and priorities and will be costly. Failing to accept it will be more costly still." □

WDR's Guidelines for the International Community

1. Adjust aid portfolios

The composition and level of aid programs need to reflect the costs to health and productivity of a damaged environment. Preventing pollution and preserving natural resources are proper goals of aid programs. The strong links between poverty, population, and environmental damage call for higher overall allocations.

2. Invest in research and technological development

Gaps in fundamental knowledge must be filled. Among the priorities for international collaboration are the scale and causes of soil degradation (especially in Africa), the potential of tropical forests for sustainable production, the potential effect of climate change, and technologies for renewable energy.

3. Ensure open trade and investment

Providing free access to industrial country markets is needed to help developing countries industrialize and grow (both of which are essential for reducing pressure on natural resources) and to enable them to take advantage of less-polluting technologies. An immediate successful Uruguay Round agreement would increase foreign exchange earnings of developing countries by more than the costs of environmental production.

4. Pay for environmental services

When industrial countries want developing countries to provide environmental benefits (i.e. preserving biodiversity, restraining greenhouse gas emissions), they should be willing to pay compensation. Such funding should be treated as equivalent to payments for imports, not as aid.

WDR 1992: Seven Suggestions for National Policymakers

1. Build the environment into policymaking

Environmental considerations need to be intrinsic to policymaking, not added as afterthoughts. Environmental impact statements are already important in project analysis. They need to be extended to policy reforms. Where economic policies bring environmental benefits, those should add support to reform; where they carry possible adverse environmental costs, the adjustment program should include targeted environmental policies to offset them.

2. Make population a priority

For the sake of both development and the environment, population issues need more attention. Educating girls, enabling women to earn cash incomes and to participate fully in decisionmaking, and investing, in better-equipped and better-financed family planning programs all allow women to determine their own reproductive behavior. It takes time for the environmental effects of these policies to be felt--all the more reason to take action now.

3. Act first on local damage

Many people are killed or made ill in developing countries by dirty water, lack of sanitation, fumes from cooking with wood, and dust and lead in city air. Soils impoverished by erosion or poisoned with badly used chemicals make it harder for developing countries to feed their people. Solving these environmental problems brings the biggest gains to health and wealth.

4. Economize on administrative capacity

Implementing environmental policy uses scarce money and manpower. To keep down administrative costs, countries need to set realistic goals and then enforce them; to work where possible with the grain of the market, not against it; to give preference to "self-enforcing" instruments such as deposit-refund schemes; and to harness popular support through local participation.

5. Assess tradeoffs--and minimize them

Governments need to be able to assess the costs of environmental damage and the least costly ways of protecting the environment. Policies should be made on the basis of explicit comparisons of cost and benefits. Citizens need to know what is being given up in the name of economic growth and what is being given up in the name of environmental protection.

6. Research, inform, train

Research should concentrate on appropriate technologies: low-cost chimneys to vent fumes from burning biomass, cheap sanitation systems to provide service to poor neighborhoods. Good information pays big dividends by helping to set sensible policy priorities. Better skills can solve environmental problems such as inappropriate use of pesticides and mishandling of toxic wastes.

7. Remember: prevention is cheaper than cure

Building pollution prevention into new investments is cheaper than adding them later. New technology is less polluting than old. Developing countries with open markets will be able to gain from importing clean technologies already in use in industrial countries.

Study Measures the Costs and Benefits of Conservation and Development

The Korup National Park in Cameroon is an example of how valuation of environmental damage and conservation costs can help inform choices about how to use the environment, according to the *World Development Report: 1992*.

The park contains Africa's oldest rainforest, which is home to numerous unique and endangered species of plants and animals. Increasing pressures to convert the forest to agriculture led the government to design a conservation plan for about 126,000 hectares of the park.

Economic valuation techniques were used to estimate the damage that would occur if these areas of rainforest were developed--as a measure of the benefits of conserving them--and compare the benefits with the costs of the conservation program.

Conserving the areas would provide local, national, and international benefits, but not all of these could be estimated.

The measurable benefits from use of the conservation area that accrued to Cameroon included direct yields from, for example, sales of forest products (32 percent of measurable benefits) and indirect benefits such as protection of fisheries and soils (68 percent). These were set against the costs of management (88 percent) and of forgone revenues from commercial forest products (12 percent). The exercise found that (at an 8 percent discount) the measurable benefits of the conservation area for Cameroon were less than the costs.

But not all benefits were measurable. People in Cameroon and in the rest of the world derive other benefits from conservation. These include "option values" (protection against loss of future benefits--say, from medicines developed from indigenous plants) and "existence values" that arise because people value the preservation of species even when they do not expect to derive any other benefits, now or ever, from them.

Since most of these nonuse values reflect benefits to people outside Cameroon, the difference between the benefits and costs of the conservation area for Cameroon --roughly $6 billion--represents the international transfers needed to justify conservation on economic grounds. The per hectare transfer would be lower than the values attributed to tropical forest conservation areas in, for example, Costa Rica. Given the diversity of species in Korup Park, making such transfers would be to the advantage of the international community.

The issue then becomes whether the rest of the world is willing to pay Cameroon for the costs it would incur to protect an environmental asset that is valuable for the world as a whole. □

Photo courtesy of the Inter American Bank

Air pollution from fertilizer plants at Cubatao, Brazil have contributed to dangerous atmospheric conditions.

Brazil and Poland Control Emissions from Public Enterprises

In Cubatao, Brazil and Katowice, Poland, state-owned enterprises were implicated in severe and persistent air pollution that caused extreme levels of exposure to particulates, according to *World Development Report: 1992*.

In Cubatao the main sources were steel, fertilizer, petrochemical, and cement plants. In Katowice steel mills, nonferrous metal smelters, chemical plants, power stations, and a wide range of other industrial plants were the principal polluters.

In September 1984 an atmospheric inversion and mounting levels of particulates spurred the governor of Sao Paulo state to decree an unprecedented state of emergency in Cubatao. The state environmental agency promptly shut down nine industries in the district of Vila Parisi and ordered an evacuation. Police from Sao Paulo city were sent to assist in the evacuation and to prevent looting. The mayor of Cubatao made the soccer stadium available for displaced residents and provided food and blankets. When atmospheric conditions improved, the state of emergency was downgraded to a state of alert (the eighth that year), and people were allowed to return to their homes.

A few months later a pipe at a fertilizer plant ruptured, releasing massive amounts of ammonia gas. Six thousand residents were evacuated and more than 60 people hospitalized. The fertilizer plant was fined, but the state governor protested that the penalty was too small.

Conditions in Cubatao have improved since then (though crises still occur periodically); plants are installing pollution control equipment and are switching to less-polluting fuel, and thousands of residents are being helped to move to more suitable areas.

The environmental agency has become more aggressive in using fines and temporary plant closures to deal with recalcitrant polluters, and the government has initiated public civil actions seeking restoration of damaged wetlands, waterways, and hillsides. Extensive newspaper and television coverage of the environmental fiasco in Cubatao has given the whole country an environmental education.

Throughout the 1990s the provincial government in Katowice attempted to improve the city's air quality by levying fees for emissions that exceeded permissible levels.

Although the rates were double those set by the national government for the rest of Poland, they were revised infrequently during the 1980s and fell sharply in real terms as prices rose.

Furthermore, because industrial plants claimed that they lacked the resources to invest in better environmental controls, emissions permits were typically set much too high to achieve reasonable ambient air quality, and enterprises were often exempted from paying fees and fines. Technically, provincial governments could close down plants for persistently violating emissions standards, but this power seems to have been exercised only once--in the case of an aluminum plant in Krakow that was due to be closed anyway.

The situation in Katowice has changed radically since 1990. Air quality has improved significantly, and enterprises are considering or actually investing in environmental controls. There are three reasons for this change: some of the worst polluters have closed down permanently; the level of fees and fines has been raised more than 10 times in real terms, and payment is enforced under a real threat of closure; and the prospect of privatization means that enterprises no longer face "soft" budget constraints and provincial authorities no longer strive to maintain industrial production at the expense of other objectives.

The moral to be drawn from these two cases is that unless public enterprises are subject to "hard" budget constraints and are accountable to the public, economic incentives for pollution control are likely to be ineffective, and direct regulation may be required. □

INFORMATION BRIEF

Biodiversity

The world is much like a species warehouse of miscellaneous goods, some labeled, many more not, whose use and value are not uniformly clear. We too often destroy part of the warehouse without asking what is inside the unmarked boxes, what items of value for human survival are lost. We blunder forward as though what is gone can be recovered, when, of course, it cannot.

Consider plant species alone. There are about 240,000 of them, but only about 3,000 plants have ever been used for food, only 150 have been cultivated on any scale, and a mere 20 account for more than 85 percent of present human consumption. Three alone—rice, wheat and maize—account for over half.

Thus, in our blundering, plant species which may have great potential as food in a hungry world, as cash crops for poor farmers, and as medicine and miracle drugs for the sick are disappearing. They become victims of indifference, greed, or the survival needs of today.

Dr. M.S. Swaminathan, president of the International Union for Conservation of Nature and Natural Resources has commented that "...abusing our limited stock of natural resources is self-destructive and irrational. But instead of nurturing these resources to provide benefits that can be sustained far into the future, too much of modern development is doing the opposite: abusing nature to provide excessive benefits for a generation or two of humans. The symptoms of this abuse are all around us, from local deforestation to global climate change."

The canopy of this tropical forest in the Solomon Islands was destroyed by loggers.

His warning is part of an increasing understanding of environmental destruction and its consequences and ultimate impact on human life. Serious concern about the global environment was rarely heard until quite recently, a passion of too few people and groups. For most of the world's population other questions — of food and survival and jobs — seemed more pressing and immediate. Certainly, for many years, environmental questions intruded minimally in discussions of economic development in less developed countries. But biodiversity and protection of the environment are now recognized as concerns and goals of more than the traditional advocacy groups. They have become a factor in the work of the multilateral agencies, the developing countries themselves in many cases, and of citizens everywhere. The relationships of plant, animal and man and their global and local environments are now recognized and considered as never before.

There are many reasons why this is so and one example is the recent recognition of the potential value of wild plant species. Population growth, rising per capita consumption, and shortages of arable land may make it important in future years to cultivate new species of crops that can produce calories, protein, specific mineral nutrients, vitamins, or fibers more efficiently than many of the species currently used.

Nutritive Value of Wild Species

The importance of wild species to human nutrition is underdocumented and not sufficiently recognized. Yet, it is estimated that 50 percent to 70 percent of the animal protein humans consume in Africa comes from wild animals.

In other areas too, subsistence harvesting of animals such as rabbits, iguanas, squirrels, fish, and birds makes a significant contribution to people's diets. Domestication or hybridization of wild species offer further potential. Among the wild animal species now being domesticated are a wild toad, a source of "frog's legs" in Chile, giant snails in Nigeria (with as much protein as a kilogram of beef), and river turtles in Amazonia.

Medicines, Industrial Uses

Wild plants and animals are also important for modern medicine and offer the potential of even greater future applications. More than 40 percent of all prescriptions written in the United States contain one or more drugs that originate from wild species (fungi, bacteria, higher plants, and animals); annual sales of such drugs exceed $8 billion.

Wild plant and animal species are of great and increasing importance to industry as sources of tannins, resins, gums, oils, dyes, and other commercially useful compounds.

The potential for new industrial products from currently unknown or poorly known plant and animal species is significant but impossible to quantify. Such products may even include hydrocarbons for an oil-short world. For example, a tree that grows only in northern Brazil produces 20 liters of sap per tree every six months and this sap, it was recently discovered, can be used directly as a fuel in diesel engines.

To date there has been little systematic screening of wild plant species for products that can be used by modern society, but some plants naturally manufacture such products in considerable quantities. And other plant compounds may become valuable as new technologies and inventions emerge. What we don't know today can hurt us tomorrow.

The solution for us is in seeking and using both vision and wisdom in protecting the species of the world — the unlabelled products of our global warehouse — which may sometime offer food and medicine to sustain distant generations. We can do that even as we pursue policies of economic development for the present inhabitants of our planet. □

World's Food Supply Depends on "Genetic Diversity" Of Plants

Saving the "genetic diversity" of plants is crucial to the struggle to meet the demand for food in developing countries, Michel Petit, Director of the World Bank's Agriculture and Rural Development Department, said in Washington last summer.

In an address welcoming agricultural experts to a meeting sponsored by the Consultative Group for International Agricultural Research (CGIAR), Mr. Petit warned that as an increasing number of plant species disappears from the planet, a decreasing number is available to be used in the development of high-yielding, pest-resistant crops. Many developing countries are facing food shortages and depend on the introduction of new crops to help them boost food production.

"The international community has become more aware of the value of biodiversity," Mr. Petit said. "Plant genetic resources constitute one important component of the world's biodiversity. These resources are threatened."

"The phenomenon of genetic erosion threatens the possibility of creating new crop varieties which can have high yields and at the same time be resistant to new pests, and to new stresses associated with changes in the environment, including global climate change, the rising sea level, or the destruction of the earth's ozone layer."

The CGIAR-sponsored meeting focused on the genetic diversity of plants and how this diversity affects the world's food supply.

The CGIAR is a group representing more than 40 countries, organizations and foundations that provide support for independent agricultural research centers around the world. Visvanathan Rajagopalan, World Bank Vice President for Sector and Operations Policy, serves as chairman of the CGIAR.

Poland Receives First Grant From the Global Environment Facility

The Global Environmental Facility (GEF) on December 12, 1991 approved its first grant--$4.5 million for a project to protect the biological diversity of two of Poland's endangered forest ecosystems.

The project supports the government's efforts to protect Poland's forest ecosystems. The project includes plans for protecting forests, flora and fauna in the Sudety Mountains in the southwestern part of the country and the Bialowieza Primeval Forest in eastern Poland. About 13,000 hectares of forests in the Sudety Mountains in the Karkonosze Region are dead, and another 8,000 are dying because of air pollution from the so-called "Black Triangle," where Poland, Czechoslovakia and the eastern part of Germany meet.

This damaged area is expanding in the eastern mountainous areas of the Sudety. The GEF project will focus on protecting the remaining forests in the Sudety and setting up a "gene bank" to ensure that plant species unique to the forests can eventually be restored. The GEF project will also help protect endangered animals, trees and other plants in the ecologically fragile Bialowieza Primeval forest, Europe's largest expanse of natural forest. This area is home to the European bison, lynx, wolf, and the black stork.

Global benefits of the project include preservation of unique plant and animal species and reduced soil erosion. Also, some of the forest areas covered by the project extend into neighboring countries.

At a meeting in Geneva in early December 1991, GEF officials tentatively earmarked up to $1 million for a companion project to help scientists protect a part of the Bialowieza forest in Belarus.

About 58,000 hectares of the Bialowieza Primeval forest are in Poland, and the remaining 87,000 hectares are in Belarus. The United Nations Education, Scientific and Cultural Organization has designated the Bialowieza National Park as a "biosphere reserve." Environmentalists consider the forest an important "natural laboratory" that can be used to develop ecological preservation programs for other parts of Poland.

The Sudety Mountains are located in the center of an ecological disaster area known as the Black Triangle. Air pollution has devastated the forest ecosystems in this area.

The GEF project will expand facilities for conserving the remaining, endangered genetic material from the Sudety forests and for protecting the biodiversity of the Bialowieza forest.

The project will set up a "gene bank" to ensure that plant species can be restored.

The GEF grant will partially finance the construction of a greenhouse, seed orchards, and equipment for collecting plants and seeds and monitoring air and soil quality and patterns of land use. The grant will also finance training for staff in charge of the project, and actions to promote organic farming in the Bialowieza forest.

Both the GEF project and a proposed follow-up project will promote sustainable development of the forests and the sound management of the forestry sector.

Governments are mainly responsible for identifying projects that are eligible for GEF support. Governments submit proposals for projects to the GEF through local U.N. Development Programme representatives or to one of the World Bank's regional environmental divisions.

A non-governmental organization may also submit proposals, but they must first be approved by the government of the country in which the project will be carried out.

A group of environmental experts from 25 countries reviews proposals and can recommend projects for GEF support. Staff from the UNDP make the final decision on projects that require technical assistance, while the World Bank is in charge of final decisions on projects that require financial or "investment" support.

Aid donors have made an initial pledge of $1.4 billion in support of the GEF. Only countries with an annual per capita gross national product of $4,000 or less are eligible for funding from the GEF. □

INFORMATION BRIEF

Global Environment Facility

It is routine today to talk of the relationship between people and their environment. But the interdependence of nations in ensuring global ecological health is often ignored and serious problems are treated as if they stop at the border. Environmental action, in that situation, has inevitably fallen a silent victim to national boundaries, sovereignty, and pride. But environmental problems, like polluted rivers that affect everyone downstream, know no borders, and we now understand better than ever before that prudent environmental management requires regional and global cooperation.

Thus it was that the idea of the Global Environment Facility was put forward in the fall of 1989 as a specific means of helping developing countries finance environmental projects with implications that were not just local. The French suggested the idea for the GEF and were supported by a related German proposal.

As well as being a potent symbol of global interdependence, the GEF has become a strong complement to the World Bank's increasing environmental activities in individual countries. The GEF is not intended to replace those activities, but to reinforce them.

In November 1990, 25 countries, both developed and developing, agreed to set up a fund of $1.3 billion. Of the 24 countries that had made their contribution by June 30, 1991, nine were developing countries.

While most of the GEF funding is intended for investment projects in developing countries with per capita GNP no greater than $4,000 in 1989, other activities—training, various studies of problems and possible solutions, the gathering of scientific information—are eligible for grants.

Those grants will enable governments, with the help of international agencies, to gain practical experience in strengthening environmental policies and the institutions that implement them. The United Nations Development Programme, United Nations Environment Programme and the World Bank, the agencies in charge of implementing the GEF, play distinct roles in meeting these goals.

The Implementing Agencies

UNDP coordinates and manages project preparation and technical assistance work. Through its offices around the world, UNDP works with governments to identify projects, and ensures that GEF projects complement other development activities.

UNEP provides guidance in selecting projects through its Scientific and Technical Advisory Panel, a group of 14 international environmental experts who set the scientific and technical criteria for use of GEF funds. Finally, the World Bank administers the GEF trust fund and is responsible for appraising and supervising investment projects.

The three multilateral agencies thus together determine whether a project qualifies for GEF support and then ensure that it protects the global environment in a cost-effective, technologically sound way, while respecting the interests of the country's people.

Four Major Tasks

The goals of the GEF are limiting emissions of greenhouse gases; preserving the earth's biological diversity; protecting international waters; and preventing further depletion of the ozone layer. In pursuing those goals, the GEF has defined its contribution in the following ways:

1. Limiting Emissions of Greenhouse Gases

The GEF can help the world community better understand and slow the process of global warming through practical, cost-effective pilot projects to reduce emissions of greenhouse gases. Areas for action include substituting cleaner fossil fuels and renewable energy technologies in power generation, agriculture, mining and manufacturing. The GEF can support energy efficiency and renewable energy activities which developing countries would not otherwise find it economically feasible to undertake. An important focus of support is the management of existing forests on a sustainable basis.

2. Preserving Biodiversity

The world's varied ecosystems and the diverse species they contain represent an invaluable global resource. They contribute a wide variety of goods, ranging from medicine and genetic resources for food production to the regulation of climate and rainfall patterns. Yet many of these ecosystems and the species that live in them are under serious threat of disruption and extinction. The richest remaining sources of biodiversity are in developing countries. The Global Environment Facility will support the efforts of developing countries to manage specific areas to ensure the protection of their ecosystems.

3. Protecting International Waters

Dumping of solid and liquid wastes in oceans and seas is a classic "global commons" problem. Collective action is needed to deal with pollution found in these water systems. Marine oil spills, industrial waste, and wastewater pollution affect international water systems and biodiversity.

4. Protecting the Ozone Layer

There is agreement in the world's scientific community that the present levels of chlorofluorocarbon emissions, halons and other gases contribute significantly to the depletion of stratospheric ozone. This layer acts as the Earth's shield against harmful ultraviolet radiation, and its depletion is expected to have grave consequences for human health and ecological processes.

To qualify for funding, a project must relate to at least one of these four areas of concern and not be economically viable in the particular country without support from the Facility. The Facility draws on expertise from both governmental and non-governmental organizations as it carefully weighs the local and global environmental impact of proposed projects. □

Mauritius to Use Sugar Cane As Energy Source

Mauritius is embarking on a project that will enable the country to meet about 15 percent of its energy needs through use of sugar cane residue.

The Sugar Energy Development Project will be partially financed by the World Bank, which approved a $15 million loan March 31. The Global Environment Facility (GEF) is contributing $3.3 million toward the project.

The project is a partnership between the private sector and the government to produce least-cost energy for the country.

World Bank economist Lars Vidaeus says that the project specifically aims at expanding the production of electricity from burning bagasse—the fibrous material of the sugar cane—and at paving the way for use of other sugar cane residue through a program of adaptive research and trials. While other countries have experimented with using sugar cane residue —other than bagasse—to produce energy, Mauritius alone will be the major center for adaptive research and trials in this area over the next five years.

"Mauritius is taking the baton for the next leg of the race," Vidaeus says about sugar biomass energy research and development. He adds that the project is a partnership between the private sector and the government "to produce least-cost energy for the country."

The World Bank loan will help expand electricity generation, improve the efficiency of use of steam at sugar factories and establish an environmental monitoring system covering the entire sugar industry. The total cost of the project, which includes construction of a 22 Megawatt power plant in the southern region of Mauritius, is $55 million. The Bank loan will amount to 27 percent of the project's cost. The GEF grant will be used for two technology studies, a training program at the new plant, technical support to the Central Electricity Board and an environmental monitoring program.

Construction of the new power plant at the Union St. Aubin Sugar Factory will take three years. When fully operating, the plant will generate 75 percent fewer sulfur dioxides and nitrogen oxides than a diesel plant. It will also reduce emissions of greenhouse gases by between 10 percent and 20 percent.

Some coal would still be burned by the power plant because no sugar is available from January to July. But Mr. Vidaeus says that an environmental assessment of using coal concluded that ground-level concentrations of particulates from coal burning will be below limits set by the World Bank and the U.S. Environmental Protection Agency.

The environmental assessment of the proposed plant was carried out by the government, industry and local research organizations as well as through consultations with local environmental non-governmental organizations. The assessment concluded that particulates would not affect public health, and that the new plant would not threaten vegetation in the neighboring Black River Gorge Forest Reserve.

Sugar has been a mainstay of the economy of Mauritius since the 17th century. It remains the largest net earner of foreign exchange, although its share of the gross domestic product has been declining.

The government adopted the Bagasse Energy Development Program last August to optimize the use of sugar in energy production and to identify various by-products for power production.

The private sugar producers and the government agreed on the need for greater use of by-products such as bagasse, a material that is separated out during cane crushing.

Mr. Vidaeus says that the project will bring four benefits:

- reduced dependence on imported fossil fuels;
- mobilization of private industry to help produce energy;
- financial diversification for the sugar industry through a new source of revenue;
- and reduction of greenhouse gases and related environmental improvements.

The government's energy strategy includes a program of experiments at sugar estates or factories. Studies would cover environmental impact, storage, boiler design and fuel-mix configuration. Using the results, industry would make plans for investments in biomass energy development using cane tops, leaves and trash. □

Environmental Protection Program For the Danube Under Way

A partnership to clean up the environment along the Danube River has been established by a group of international donors and non-governmental organizations and the countries located along the river.

Participants in a meeting in Sofia, Bulgaria, September 26-27, 1991, sponsored by the Global Environment Facility partners--the World Bank, the United Nations Development Programme, and the U.N. Environment Programme--and the European Community began preparing proposals for environmental activities in the region.

During the first phase of the program, institutions will be designated in each country in the Danube Basin to plan and carry out environmental initiatives.

Other activities to be carried out in the first phase include developing an action plan and studying each country's environmental legislation, assessing pollution sources in the region, and strengthening data management and pollution monitoring.

Recommendations made in the first phase of the program will guide policy actions and large-scale environmental investments.

The first phase is estimated to cost about $35 million over three years. Financing has been tentatively pledged by the Global Environment Facility, the European Community, the U.S. Agency for International Development and other institutions such as the European Bank for Reconstruction and Development, the European Investment Bank and the Nordic Investment Bank. □

World Bank, Global Environment Facility Support Project In Mexico to Control Pollution, Protect Biodiversity

Mexico is tackling pollution and preserving the nation's rich biodiversity through a project being supported by a $50 million World Bank loan and a $30 million grant from the Global Environment Facility (GEF).

The grant marks the first time the GEF is supporting a project in Latin America.

Mexico will use the World Bank loan mostly to strengthen the operations of the country's main environmental protection agency, the Secretariat of Urban Development and Ecology.

The agency, through its central and local offices, will strengthen programs to monitor and control water and air pollution and to ensure that new investments in industries and other sectors of the economy are environmentally sound.

The GEF grant will be used to fund programs to protect 17 parks and reserves that are habitats for endangered or endemic species of plants and animals. Mexico has the world's largest number of reptile species. Seven of the world's eight species of marine turtles come to Mexican shores to lay eggs. And, Mexico harbors 22,600 known plant species.

To protect the diversity of plants and animals, Mexico has already established a national system of 44 national parks, eight biosphere reserves, and 13 other natural preserves.

Mexico faces a number of difficult environmental challenges, according to Robert Kaplan, the World Bank official who oversaw preparation of the project.

The government is focusing on building a strategy for sustainable development. But you can't have sustainable development without environmental protection.

Rapid and uncontrolled industrialization and population growth in the country's three largest cities--Mexico City, Guadalajara and Monterrey--have led to severe pollution of air and water. Subsidies on water, petroleum, and other forms of energy have encouraged wasteful use of these resources, worsening pollution in some areas, Mr. Kaplan says.

But environmental problems plague rural areas as well. Farmers have stripped forests, leading to soil erosion. About 40 percent of the country is considered severely eroded, and as much as 80 percent at least somewhat eroded. Only 25 percent of forest lands are considered "biologically intact."

The government estimates that unless soil erosion is stopped soon, maize production will fall by 1 million tons at the end of this decade.

According to Rainer Steckhan, director of the World Bank department in charge of lending to Central America, the project plays an important role in Mexico's overall economic development strategy.

"Now that economic adjustment is almost complete, the government is focusing on building a strategy for sustainable development," he says. "But you can't have sustainable development without environmental protection."

The World Bank official says top government officials recognize the link between poverty and environmental decline, so the government is combining efforts to reduce the incidence of poverty with steps to protect the environment.

Rainer Steckhan

Mr. Steckhan notes that the project is only one part of the government's efforts to protect the environment, noting that the World Bank has recently approved five loans for development projects that include substantial environmental actions. He adds that the government has already made progress in protecting the environment.

In 1988, the government enacted a tough environmental-protection law, and in 1991, it tripled the budget of the main environmental agency.

The project will complement current and proposed projects in agriculture, infrastructure development, and mining. Two projects to assist Mexico in reducing air pollution in metropolitan Mexico City are also being prepared. □

Mexico Phases Out Use of CFCs

A grant totaling $180,000 will help Mexico finance a project to eliminate the use of chlorofluorocarbons (CFCs) in the production of aerosols by 1995.

The grant is being provided by the Montreal Protocol Interim Multilateral Fund, which is administered by the World Bank and implemented jointly by the U.N. Development Programme and the U.N. Environment Programme.

Almost five years ago, 24 nations, including Mexico signed the Montreal Protocol on Substances that Deplete the Ozone Layer. The protocol sets limits on the production and consumption of three groups of ozone-depleting substances. Mexico was the first country to ratify the protocol.

Mexico used more than 8,000 tons of so-called "Group I" ozone-depleting substances, which include CFC-11 and CFC-12. The project being supported by the grant will demonstrate the feasibility of recycling technology for CFC-12 and to fund efforts to begin phasing out CFC propellants in aerosol manufacturing.

Mexico announced last year that it plans to complete the phase out of CFCs by the year 2000, 10 years earlier than the phase-out date proposed under the Montreal Protocol.

Automotive Air Pollution Threatens Health Of 400 Million People

Pollution from cars, trucks and other motorized vehicles is literally choking the life out of some cities of the developing world, and in some regions, the problem is getting worse.

This type of air pollution used to be a problem confined to the industrialized world. But today, as people flock to cities and become more dependent on motorized vehicles for transportation, the problem is now just as severe in some developing-country cities as it is in places like Los Angeles and New York.

Asif Faiz

Rising incomes, along with a desire for greater mobility and travel, says World Bank official Asif Faiz, are leading to increased automobile ownership in many parts of the developing world. And the growing demand for fast, reliable distribution of goods is increasing the number of trucks, adds Mr. Faiz, former highways adviser in the World Bank's Infrastructure and Urban Development Department and currently Chief of an Infrastructure Division in the Bank's Latin America and Caribbean regional office.

"The growth in road transport is unlikely to be curbed in developing countries," warns Mr. Faiz, who co-authored a World Bank report, *Automotive Air Pollution: Issues and Options for Developing Countries.*

About 600 million motorized vehicles are on the world's roads today. In a little more than two decades, that number is expected to double, with most of the growth taking place in developing countries.

"Motorization is inextricably linked to urbanization," Mr. Faiz says, pointing out that almost half the world's population will be living in urban areas by the end of this century. By the year 2000, almost three-fourths of the world's cities with populations of at least 10 million people will be in developing countries. An additional 18 cities with populations of between five million and 10 million will also be in developing countries, he adds. "Without effective measures to curb air pollution, as many as 400 million city dwellers in developing countries will be exposed to unhealthy and dangerous levels of air pollution by the end of the century."

In many developing countries, motor vehicles have no emission-control equipment, such as catalytic converters. Street space is limited, so polluted air becomes trapped between buildings. Traffic is often jammed, resulting in high levels of carbon monoxide, smoke and "particulates", or airborne particles of various pollutants. And the low-quality fuel used in most of these vehicles generates large amounts of pollutants, such as lead and sulphur dioxide.

Pollutants associated with motor vehicles --carbon monoxide, nitrogen oxides, ozone, sulphur dioxide, particulates and lead-- commonly exceed the World Health Organization's recommended limits in many large cities, such as Bangkok, Istanbul, Lagos and Mexico City. "Mexico City is today by far the most populous and the most polluted metropolis in the world," Mr. Faiz says. "Up to 70 percent of newborn children in Mexico City have excessive levels of lead in their bloodstreams at birth," mostly because of pollution from motorized vehicles.

Airborne pollutants, such as sulphur and nitrogen oxides, contribute to "acid rain," which can destroy forests and eat slowly through buildings and infrastructure. And some of these pollutants, notably carbon dioxide, contribute to the "greenhouse effect."

But motorized vehicles are not the sole source of air pollution in urban areas, he notes. Industries are another major source, and automobile exhaust can exacerbate other forms of air pollution. "Motor vehicle emissions can aggravate the already elevated levels of particulates and sulphur dioxide generated by domestic heating and cooking with coal, lignite, firewood, charcoal and animal dung, as in Ankara, Warsaw and a number of cities in South Asia and sub-Saharan Africa," Mr. Faiz says.

The situation is not hopeless, Mr. Faiz asserts, but developing countries need to move quickly to prevent the problem from getting out of control.

One of the first steps almost all developing countries need to take is raising the public's awareness of the hazards of air pollution. "Consciousness of the environ-

Air pollution in Bangkok worsens as the number of motor vehicles grows at 10 percent a year.

ment just doesn't exist in some countries," Mr. Faiz says. "People simply don't have any knowledge of the health or environmental costs of air pollution." Each country's air-pollution problem is unique, so there is no single solution. "Pollution problems depend a lot on cities' geographical features, layout, climate, and what types of vehicles use the roadways," Mr. Faiz says. In Mexico City, for example, ozone is a severe problem because sunshine increases the level of this gas in the air. The city's geography also acts to trap ozone in the atmosphere. In Bangkok, carbon monoxide is a problem because of the large number of motor vehicles stuck in stop-and-go traffic. Solutions should take into consideration not only the types and causes of pollution, but also each country's income. But regardless of income, developing countries could consider

- measures to make vehicles more energy efficient and less polluting;
- promotion of cleaner fuels, first by reducing lead in gasoline and sulphur in diesel fuel;
- improvements in traffic management so that there are fewer traffic jams, less wasted fuel and fewer emissions of pollutants; and
- a variety of government policies aimed at creating incentives for people to drive less, use cleaner fuels, and stop using vehicles that produce large amounts of pollution.
- a simple measure like encouraging good maintenance programs for cars would help reduce air pollution considerably," Mr. Faiz says. "A car that runs well uses less fuel and produces less pollution."

Devising an effective motor vehicle emission-control program in developing countries is hindered by institutional and technological constraints, Mr. Faiz says, adding that tackling the problem will involve some costs. But if resources are devoted to finding solutions now, the environmental costs will be smaller later. "Resolving the problem is ultimately a question of will."

Journalists may receive complimentary review copies of *Automotive Air Pollution: Issues and Options for Developing Countries* by writing on company letterhead to the Publications Officer, World Bank, 1818 H Street N.W., Room S-10-063, Washington, D.C. 20433, U.S.A. □

Beijing Launches Program To Control Pollution

Environmental-protection regulations have been in effect in Beijing since the early 1980s, and the city has developed an environmental-protection strategy with targets to be reached by the year 2000. But enforcement of these regulations has been difficult, and Beijing still faces an array of serious environmental problems.

The World Bank has approved a $45 million loan and the International Development Association a credit of SDR 60.1 million ($80 million) to help strengthen the city's long-term environmental protection plans and enforcement of environmental regulations. The project will also finance construction of physical works to address some of the city's immediate pollution problems.

The measures financed under the project are part of the city's first steps toward improving the environment. They include

- construction of a 32-kilometer heat transmission pipeline from the Shijingshan cogeneration power plant to the western part of the city, providing space heat and hot water to about 800,000 people to reduce air pollution from burning coal.
- construction of additional sewer networks to collect wastewater now polluting the southern and northwestern areas of the city, and the establishment of a wastewater company to manage more efficiently the city's liquid wastes.
- construction of a 72-hectare sanitary landfill capable of handling 2,000 tons of refuse a day.
- provision of a $45 million line of credit to help major polluting industries finance the installation of new technology and facilities to comply with environmental regulations.
- provision of technical assistance for studies to help Beijing plan sustainable investments aimed at improving and maintaining environmental quality in the long run, and to establish institutions responsible for regulating, monitoring, transporting and disposing of industrial hazardous waste.

The main source of air pollution is the 20 million tons of low-grade coal that are burned each year by industries, power-generating stations and residents who use it to heat their homes, cook meals and boil water.

The city's environmental-protection strategy for air pollution calls for changing the structure of fuel use, says John Huang, a sanitary and environmental engineer who is managing the project for the World Bank. "For polluting industries, the project will help to demonstrate how new technology can be used to increase production efficiency and reduce pollution," he says.

Some restructuring of fuel use has already taken place, Mr. Huang notes. Most residents now use bottled or piped gas for cooking.

Beijing's development plan calls for supplying about half of the population with heat and hot water produced by cogeneration power stations located outside the city by the year 2000. Cogeneration utilizes part of the waste heat that is produced in generating power and therefore reduces the total amount of coal burned.

One of the most important parts of the World Bank-financed project is a major study that will analyze alternative strategies for solving the city's environmental problems, which the Japanese government is cofinancing with a $1.6 million grant, says Adrienne Nassau, a financial analyst who is a member of the World Bank team that developed the project. "We're going to look at all aspects of environmental control to ensure that the least-cost solutions are implemented," he says.

As stricter regulations on wastes are put into effect, many enterprises using outdated technology may find it difficult to comply without making major investments to restructure their production processes or to build pollution-abatement facilities.

Some of these enterprises will have to raise their prices to generate additional revenues. Others may have to close down. These industries are the ones that will be entitled to seek assistance from the $45 million line of credit that the Bank is providing.

Mr. Huang points out that the municipal agencies involved in the project will be required to conduct strict economic analyses to avoid financing industries which are no longer economically viable. □

Air Pollution Worsens in Eastern, Central Europe As Motorized-Vehicle Use Increases

The economies of Eastern and Central Europe are experiencing a shift from rail transportation toward heavy use of trucks. Governments need to prepare for the change if they are serious about protecting the environment, according to a World Bank official.

Railroads carry up to 75 percent of the region's goods. As the economies become more market oriented, they're likely to resemble the Western European pattern in which 80 percent of the goods are moved by truck, says Philip Blackshaw, a principal transport economist with the World Bank.

Such a shift will take place because new consumer industries will emerge and require speedier delivery and services--road transport will be faster and more flexible. And the region's industries will produce fewer goods for markets in Eastern Europe and the former Soviet Union--where rail systems dominate--and instead ship more to Western Europe where highways are the more widely used system of transportation.

These changes in the freight market, as well as increasing ownership of private cars, mean that the vehicle population of Central and Eastern Europe could double over the next 20 years. Actions must be taken to reduce vehicle emissions, manage the road network and the existing vehicle fleet more efficiently, and make sure that road users bear the cost of adverse environmental effects, Mr. Blackshaw says. "There is strong support for environmental improvement throughout Central Europe. It's certainly on the agenda of all these countries."

But the challenge is formidable, adds Mr. Blackshaw, who presented a paper entitled, "Road Transport and the Environment" during the 23rd International Road Transport Union Congress meeting in Barcelona, Spain, April 29-May 2.

While vehicles per capita in Central and Eastern Europe are one-third to one-half of the ratio for Western Europe, they already cause a lot of air pollution. Road transport accounts for 90 percent of the air-borne lead particles in Hungary, Mr. Blackshaw says.

Trucks produced in the former Soviet bloc have few, or no, pollution control devices and run on so-called "dirty" fuels. In addition, there have been few requirements on vehicle owners to maintain fleets to minimize pollution.

The remedies range from requiring the sale of cleaner gasoline and raising the price of gasoline to discourage the waste of fuel to more novel measures, such as special taxes or fees on cars that enter central cities.

Blackshaw says that Central and Eastern European countries should move toward the emission standards in effect in Western Europe where all new cars by the end of 1992 will use unleaded gasoline and will have catalytic converters to reduce emissions of pollutants.

Reducing the lead content in gasoline and the sulfur content in diesel fuel is especially important for the region, Mr. Blackshaw says. "Cleaning up the fuel is one of the easier things to do."

Road user charges--taxes on fuel and vehicles, tolls and parking fees--need to be increased to reflect not only the cost of providing roads, but also the cost of road congestion and air pollution. In some countries of the former Soviet bloc, gas prices are only about 30 cents a gallon--well below the economic cost of fuel--so there is actually a negative tax on fuel, and annual vehicle taxes are negligible, Mr. Blackshaw says. Even in Hungary, which now has fuel taxes comparable to Western Europe, the charges do not reflect the full costs of road use by cars in urban areas and by heavy vehicles throughout the country. Taxes on diesel fuel therefore need to be increased and supplemented with substantial annual taxes on heavy vehicles, and special charges for using cars in inner-city areas.

And while higher road user charges might make it more expensive to get around by car, Mr. Blackshaw says that most of the Central and Eastern European countries have good public transit systems as an alternative for transportation.

"We're trying to advise Eastern and Central Europe to avoid going the route of Western countries which now feel they made a mistake," in under charging for the use of cars, which have displaced mass transit in major cities in many countries, Mr. Blackshaw adds.

He suggests that all new vehicles purchased in Eastern and Central European countries starting in 1995 meet standards set by the European Community. Meeting that goal would require a well-run program of vehicle-emission testing and inspection. These measures could help reduce emissions by 25 percent and improve fuel economy by 3 percent to 7 percent.

Some steps are under way. Hungary, for example, has just introduced a tax system that encourages people to purchase cars that have pollution controls and more efficient engines.

The governments also need to improve truck utilization by privatizing the industry and removing barriers that restrict the possibilities for obtaining return loads when operating in foreign countries. This will require cooperation with and from the countries of the European Community. □

Project Reduces Air Pollution in Sarajevo

A 1976 World Bank loan helped the city of Sarajevo, Yugoslavia, reduce air pollution--which was so bad it would on some days cause large numbers of deaths from respiratory and cardiovascular diseases--to air so clean the city was chosen as the site for the 1984 Winter Olympics.

The Mayor of Sarajevo at the time the loan was made saw the cleanup of the city as a unique cooperative effort between the citizens and an international organization--the people of Sarajevo had contributed some of their earnings toward financing the cleanup. He said, "what is most important to us is that our children will be able to grow up in the same healthy atmosphere that our grandparents enjoyed ... We are also pleased that we are now able to host the Olympics. There is no doubt in my mind that the Sarajevo of 10 years ago would not have been a fit place for the winter games."

Eastern, Central Europe Face Costly Environmental Clean-Up

Cleaning up the environment in Eastern and Central European countries will be a "daunting" task costing billions of dollars in the coming decades, according to Harinder Kohli, the director of the World Bank's Technical Department for Europe, the Middle East and North Africa.

Speaking at a conference in the Czech and Slovak Federal Republic last summer, Mr. Kohli said that actions to save the environment in the region will depend heavily on actions to reform centrally planned economies, which have failed to provide people with incentives to protect natural resources.

Harinder Kohli

The environment is an important element in structural adjustment programs, "where the focus is reform of pricing policies and removal of incentives working against the environment," the World Bank official said.

Economic reforms, such as the lifting of heavy subsidies on energy, will help improve the environment by discouraging waste, Mr. Kohli said. But he warned that the magnitude of investments to prevent further destruction of the environment "are truly staggering." Poland, he noted, will require up to $270 billion in investments during the next two to three decades.

In addition to clean-up programs in Poland and other countries, government environmental-protection agencies will have to be developed or strengthened, laws aimed at preventing pollution will have to be enacted or expanded, and additional economic incentives will have to be introduced to promote environmentally sound industrial development.

The environment is "a vital part" of the World Bank's assistance strategy for the region, Mr. Kohli said. The World Bank has already approved several loans for projects designed to either clean up the environment or prevent further environmental decay.

The Bank has also approved loans to support economic reform programs, which include a variety of environmental-protection efforts.

The World Bank has supported international efforts to protect the region's environment. These efforts include programs to clean up the Baltic and Mediterranean seas.

The international community--with support from the World Bank--must still sort out how the costs of environmental protection in the region should be divided among governments, the public and enterprises.

Mr. Kohli concluded that although the World Bank emphasizes the economic aspects of sound environmental management, "the ultimate goal must be to improve the quality of life, and especially public health." □

Stephen Lintner

A cement factory in Estonia spews cement dust which has an impact on human health and vegetation.

Bank Plans Study of Acid Rain in Asia

A study of Asia's "acid rain" and "greenhouse gas" problems has been proposed by the World Bank, according to a report by Gloria Davis, chief of the Environment Division of the World Bank's Asia Region.

The study will identify the main producers of pollutants that contribute to global warming and acid rain, which can destroy forests, agricultural areas, buildings and infrastructure.

Acid rain, caused by emissions of sulphur dioxide and nitrogen oxides, has been an issue of widespread concern in North America and Europe, Ms. Davis says.

"The situation in Asia, however, has received little attention and potentially could be much bleaker," she warns. "Fossil fuels are already used in such large quantities that local air pollution is becoming a serious problem." Ms. Davis adds that sulphur emissions causing acid rain are also high in several Asian countries, especially China, India and Thailand.

Gloria Davis

Expanding energy use, with a major shift toward coal in some countries, will result in a substantial increase in acid rain and greenhouse-gas emissions, she says. "The total projected sulphur dioxide emissions for the Asian countries by the year 2010 will far exceed emissions of North America, and Eastern and Western Europe combined."

Ms. Davis points out that winds transport a substantial amount of sulphur emissions hundreds of kilometers from their source. As a result, acid rain in one country might be caused by pollution in a neighboring country.

Ms. Davis' report appeared in the latest issue of the *Environment Bulletin*, published by the World Bank's Environment Department.

India Steps Up Efforts to Control Industrial Pollution

India's efforts to promote environmentally sound industrial development will be bolstered by a $124 million World Bank loan and a credit of SDR 23.4 million ($31.6 million) from the International Development Association. This marks the first time the Bank has supported a project in Asia dedicated entirely to controlling industrial pollution.

India will use the World Bank loan to finance a program designed to reduce industrial pollution caused by chemical industries in Gujarat, Maharastra, Tamil Nadu and Uttar Pradesh.

The government plans to cut industrial use of water by 25 percent, stop the dumping of solid wastes, and contain emissions of nitrogen and sulphur oxides.

Producers of dyes, fertilizers, pharmaceuticals, pesticides and petrochemicals are among India's worst polluters, discharging waste into rivers and other bodies of water.

A number of smaller industries have been violating environmental codes because they are unable to meet the costs and technical requirements of installing environmentally safe systems.

Many of these industries are located in "industrial estates," where waste-treatment facilities are shared. But even in areas where waste-treatment facilities are available, effluents are often discharged untreated because there is insufficient enforcement of laws in India on waste disposal.

The World Bank will help the government strengthen the capacity of monitoring agencies to ensure compliance with environmental laws. The loan also includes funds earmarked for building waste-treatment facilities in industrial parks to be used by small and medium-sized industries which cannot afford the technology themselves.

India's industrial pollution problems have persisted partly because the country's protective trade regime and pricing policies have unintentionally encouraged wasteful use of raw materials. High tariffs have shielded smaller industries--which operate at environmental standards that are well below world levels--from competition.

During the next five years, the government plans to step up environmental protection measures aimed at cutting industrial use of water by 25 percent, stopping the dumping of solid wastes into rivers and other bodies of water and containing emissions of nitrogen and sulphur oxides at current levels.

Long before the 1985 chemical-plant disaster that killed thousands of people in the city of Bhopal, India had been moving forcefully to control industrial pollution. In the early 1970s, for example, India established a network of laws, regulations and monitoring agencies to protect the environment, but the tragedy heightened the government's commitment to environmentally safe industrial development.

But, despite the fact that the institutional framework is much more advanced than in other developing countries, relatively "dirty industries" and manufacturing processes--which are under heavy economic and environmental pressure in developed countries--are still operating in India.

The project is a small, long overdue step in solving environmental problems, according to officials in the World Bank's Asia region. Approval of the loan underscores the Bank's commitment to deal with the environmental problems caused by industrialization and to encourage sustainable industrial development. □

Grass Roots Initiatives Will Play Important Role In Tackling Urban Environmental Problems

An increasing number of cities in developing countries are falling victim to acute, severe environmental problems, but these problems cannot be resolved without popular support, according to World Bank urban planner Josef Leitmann.

Many aid agencies and governments have typically focused on finding ways to deal with environmental problems in the long run. But to clean up urban areas in the short run, a new approach is needed, says Mr. Leitmann, who works in the Bank's Infrastructure and Urban Development Department.

The new approach revolves around people's participation in environmental-protection or clean-up programs, the World Bank official says. "Solving urban-based environmental problems cannot be achieved without building political constituencies that demand a better quality of life," he asserts. Urban groups must understand the causes of their problems and learn to vocalize their concerns. There is commonly little public awareness about the sources and effects of urban ecological decay, and target populations are rarely involved in the planning and implementing of environmental infrastructure and services, Mr. Leitmann adds. This is particularly the case among vulnerable groups such as impoverished women and the elderly.

Urban environmental problems requiring immediate attention include a lack of safe water, air pollution, and inadequate management of hazardous wastes.

Governments and development agencies have recently experimented with three new ways to encourage the international community to place urban environmental problems toward the top of the global environmental agenda, Mr. Leitmann explains.

The first way involves a "bottom-up" approach, in which a city or group of cities takes the initiative to hold a meeting that brings together municipal leaders, administrators, community groups, business leaders, academics or representatives of aid agencies to discuss urban environmental issues and priorities. The goal is to reach a consensus on the characteristics of the problems and on a plan of action.

The consensus can be translated into a statement or declaration, which meeting participants can take with them to other environmental fora for action. An August 1991 conference, "World Cities and Their Environment," is an example of the bottom-up approach. City officials and representatives of non-governmental organizations (NGOs) from 135 urban areas attended the conference, which concluded with the development of a "Toronto Declaration." Environmental recommendations included in the declaration were intended to stimulate discussion during the forthcoming United Nations Conference on Environment and Development, known also as the Earth Summit.

UNICEF/Jim Wright

Family living in squatter village in garbage dump in the Philippines.

Another way involves helping international organizations establish some priorities for intervention in particular cities, strengthening local efforts for environmental planning and management, and promoting the exchange of information between cities.

The Metropolitan Environmental Improvement Program, financed by the U.N. Development Programme and carried out by the World Bank, is an example of this approach. The MEIP's goal is to achieve a higher level of integration of urban economic planning, industrial development, poverty alleviation, and environmental actions in several Asian cities. The MEIP targets its actions to metropolitan environmental bureaus and pollution-control agencies. The MEIP also involves the mass media, the private sector, NGOs, and community groups. The advantages of the MEIP are that the program is linked to the work of the World Bank , is well funded, and can respond to conditions in different cities.

A third way consists of efforts by NGOs to operate transnationally. An example of this approach is the International Council for Local Environmental Initiatives, which is an international NGO that assists its members in developing local capacity for carrying out environmental-protection programs.

To ensure that individuals and community groups play an important role in identifying urban environmental problems and carrying out environmental-protection efforts, international aid donors may insist on popular participation as a prerequisite for assistance, Mr. Leitmann suggests.

He says that environmental problems faced by residents of the developing world's cities must be distinctly addressed by the international environmental community because of the immediate threats posed to health and productivity. Organized urban constituencies will play an essential role in articulating these concerns and sustaining the demand for environmental action.

This article has been adapted from an article by Mr. Leitmann that appeared in the February issue of *The Bank's World*, the magazine for staff of the World Bank. □

INFORMATION BRIEF

Debt-for-Nature Swaps

During the 1980s, many developing countries found themselves in an economic quagmire, created in part by falling commodity prices and large interest payments on loans from commercial banks in industrialized countries.

In the process of boosting exports or merely trying to survive, some developing countries and their people put excessive demands on their natural resources, particularly tropical forests which were already under pressure from commercial logging, clearing for agricultural purposes, and the needs of increasing population.

Rain Forest Protection

Debt-for-nature swaps were begun by private, non-government environmental groups as a way to preserve rapidly disappearing tropical rain forests in Latin America.

The first swap was in Bolivia where the Beni biosphere reserve was protected in 1987 when Conservation International bought $650,000 worth of Bolivian debt owed to Citicorp for $100,000. The Bolivian government set aside 330,000 acres that were home to a group of nomadic Indians as well as habitat for 13 endangered species. The government also established three additional reserves totaling 3.7 million acres. Then, the United States Agency for International Development provided $150,000 and the Bolivian government the equivalent of $100,000 for personnel to manage and protect the reserve. All of that not only protected the forest, watershed, and native inhabitants, but it permitted some grazing, some logging, and the expansion of settlements as necessary.

Debt-for-nature swaps cannot by themselves solve debt or environmental problems, but they do alleviate both.

Since the first swap, over two dozen more have been negotiated in Bolivia, Costa Rica, Madagascar, the Dominican Republic, Ecuador, Poland, the Philippines, Zambia, Ghana and Mexico. Funding has come from non-governmental organizations (NGOs), donor governments, and commercial banks, and has generated more than $60 million in local currency for conservation. The face value of the debt involved in these swaps is about $100 million.

Pitfalls and Challenges

Debt-for-nature swaps cannot by themselves solve debt or environmental problems, but they do alleviate both as they protect the forests and their human, animal and bird inhabitants.

Costa Rica, for example, has retired a fifth of its foreign debt through such swaps, while spending more than $100 million on protecting its dry and tropical rain forests. The Mexican swap represents half of one percent of the country's total debt. Even with increased use, the swaps will not produce a major reduction of most developing nations' debt, but they will help arrest casual and exploitative damage to the forests.

In these swaps, an indebted country is effectively forgiven part of its debt, but it also must repay the remaining portion more quickly. When the government prints more money to meet such obligations, inflation can increase. As a result governments must be careful how much debt they retire this way. On the conservation side, the best long-term protection for tropical forests is to address the conditions that drive people to plunder forests in the first place. That means alleviating poverty and providing work opportunities, which are also keys to servicing debt.

These limitations aside, debt-for-nature swaps have been valuable, not only in lightening debt burdens but also creating a framework for environmental protection.

Future of Debt-for-Nature Swaps

The U.S. government is considering stepping up its direct role in debt-for-nature swaps as part of its "Enterprise for the Americas" initiative. Loans from the Agency for International Development, Export-Import Bank, and Commodity Credit Corporation could be retired to promote environmental goals in Latin America.

While debt-for-nature swaps are not part of the World Bank's lending operations, the objectives of those swaps fit with Bank support for conservation and debt reduction.

Even with increased use, the swaps will not produce a major reduction of most developing nations' debt, but they will help arrest casual and exploitative damage to the forests.

In 1990, for example, the Bank advised the government of Madagascar and donor agencies on ways to integrate a debt-for-nature swap with the country's environmental action plan, and continues to monitor the resulting activities.

In a parallel effort, the International Finance Corporation (IFC) an affiliate of the Bank, transferred a 143,000 acre parcel of undisturbed subtropical forest in Eastern Paraguay to the Nature Conservancy and a Paraguayan environmental group. The property, which was acquired by the IFC in a foreclosure in 1979, supports one of the richest ecosystems in its area. Within the site more than 300 species of birds have been identified, as well as populations of river otters, giant nutria, and numerous other endangered animal species.

The IFC transferred the land for $2 million, substantially lower than the $5-7 million the land would bring if sold to developers for commercial logging and agriculture. As a condition of the sale, the land must be used solely as a nature reserve, a trust must be established to defray operating expenses, and the indigenous population must be permitted to use the land as it normally would. □

IFC Land Transfer Will Protect Paraguayan Rainforest

One of the last remaining stands of undisturbed subtropical humid rainforests in Latin America--a 58,000 hectare parcel of land in Eastern Paraguay --will be transferred by the International Finance Corporation (IFC) to the international environmental group, the Nature Conservancy, and its Paraguayan partner, Fundacion Moises Bertoni para la Conservacion de la Naturaleza (FMB).

IFC is the World Bank affiliate that supports the growth of the private sector in developing countries. The Nature Conservancy is a private organization based in the United States that is committed to the global preservation of natural diversity. FMB is a Paraguayan, private non-profit foundation established in 1988.

IFC will transfer the land to the environmental groups for $2 million, substantially below the $5 million to $7 million the land would be worth if sold to developers for commercial logging and agriculture. The transaction is conditional upon the land being used solely to create a nature preserve, a trust being established to defray the reserve's operating expenses in perpetuity, and the indigenous population being permitted to use the land for traditional hunting and gathering.

The land is one of two parcels acquired by IFC through the foreclosure in 1979 of a mortgage related to a wood-processing project. The parcel supports one of Paraguay's richest ecosystems, with more than 300 species of birds and populations of river otter, giant nutria and a number of endangered species. The site is also within the area that was the traditional habitat of the nomadic Ache Indian Tribe. The land is near the Mbaracayu Mountains at the Brazilian border.

According to IFC Executive Vice President Sir William Ryrie, the land transfer has been in the making for several years; the Nature Conservancy approached IFC about the idea in 1987. "The Government of Paraguay strongly supports this initiative," he said. "As part of IFC's sale, the government will provide adequate legal protection against any actions which would be inconsistent with its (the land's) status as a nature reserve." □

Using Energy Efficiently Helps Stave Off Global Warming, IFC Head Says

The energy sector is the source of about half of the world's "greenhouse gas" emissions, so governments and the private sector must work together to promote more efficient use of fuels, according to International Finance Corporation Executive Vice President William Ryrie in a speech at the Hague in November 1991.

Addressing experts on the environment and the energy sector, Mr. Ryrie said the threat of global warming requires the international community to create incentives for businesses and individuals in all countries to stop wasting fuel and adopt technologies that will reduce pollution.

Mr. Ryrie pointed out that today, most greenhouse gases are produced in the industrialized countries, which consume the lion's share of the world's energy resources. But as developing countries industrialize and become more populated they, too, will become major producers of these gases. "In 1989, per capita energy consumption in the industrialized world was nearly 10 times what it was in the developing countries," he said. "But in developing countries, energy demand has continued to grow rapidly," with energy consumption in low- and middle-income countries rising four percent between 1980 and 1989, compared with only one percent in countries belonging to the Organization for Economic Cooperation and Development.

Low prices are to blame for energy waste in both developed and developing countries, he said. When energy is cheap, there is little incentive to conserve it. "Efficiency of energy use is determined mainly by the price," the IFC chief said. "Generally, the price of energy to consumers in the world today is too low to stimulate significant advances in technologies for more efficient and more environmentally benign use of energy," he added. "When oil prices rose in the 1970s, consumers responded with conservation and more efficient technologies."

Most greenhouse gases are produced in the industrialized countries, which consume the lion's share of the world's energy resources.

Sir William Ryrie

In many developing countries, energy is heavily subsidized, Mr. Ryrie said. Governments must ensure that prices reflect market forces and national and international environmental goals, he said. "Only governments can influence prices in a way that takes account of the interests of future generations."

He pointed out that there is a trend in developing countries to adopt "more realistic pricing" as part of national economic adjustment programs.

The developed countries have an important role to play in helping the developing countries make more efficient use of energy, Mr. Ryrie said. "The greenhouse effect is something which concerns all of mankind," he said. "We must ensure that the cost of energy conservation, a global interest, is shared fairly."

The private sector must also play an important role in promoting energy efficiency.

"A new generation of corporate strategies seems to be emerging, starting from the premise that a company needs to derive a substantial portion of its competitive advantage from superior environmental performance," Mr. Ryrie said.

He cited statistics demonstrating how corporate efforts to reduce pollution and make better use of energy can be profitable. The U.S.-based, 3-M Company estimates that since 1985, it saved $650 million by adopting energy-conservation technologies. "I believe the enlightened self-interest of the energy industry, as well as corporations that are significant users of energy, calls for them to play a major role (in boosting energy efficiency)." □

Global Warming and the Developing World

Poorer Nations Could Be Most Vulnerable to Global Climate Change

Nations all over the world have become increasingly troubled by the buildup in the atmosphere of "greenhouse" gases. Some fear that these gases--primarily carbon dioxide, methane, nitrous oxides, ozone, and chlorofluorocarbons (CFCs)--could trigger a significant warming of the earth's surface, with potentially harmful, even devastating, social and economic consequences.

Scenarios abound of vastly changed patterns of rainfall, different temperature levels, radically changed ocean currents, increased frequency and intensity of natural disasters, and rising sea levels.

The ramifications could include severe damage to vegetation in some areas, parts of entire countries being submerged under water, fertile lands being turned into deserts, and ensuing mass migrations. But at this stage, clear scientific evidence confirming such an enhanced greenhouse warming is still lacking.

Still, most developed countries have already begun debating domestic policy options for reducing greenhouse gas emissions. But it is the developing nations that could be most vulnerable to any significant global climate change, because a greater percentage of their gross national product originates in agriculture and, given resource constraints, they would be the least able to adapt. It is the developing nations that could be most vulnerable to any significant global climate change.

Even with the tremendous uncertainties surrounding changes that might be brought about by global warming, there are clear actions to take and policies to follow. Developing countries now have a major opportunity to increase incentives for sustainable energy resource use, shift to cleaner alternative fuels and technologies, and improve efficiency in energy production, distribution and end use. Such initiatives not only address the greenhouse gas problem, but they also make good economic sense.

Development ultimately depends on the effective substitution of various forms of energy for human labor. Whether this energy is used to move water, make cement, heat a building, operate a truck, of cook food, it is an input into making the human condition more bearable.

Developing countries, almost by definition, consume little energy other than that generated by human labor, so for them, the future hinges on expanding energy use in the whole range of economic and social activities.

But this requires large amounts of capital, a commodity in scarce supply in the developing world. For electric power supply alone, the annual investment bill for all developing countries is projected to be up to $100 billion.

Moreover, the projected demand for investments in oil, gas, and coal are at least of similar orders of magnitude. Therefore, developing countries are increasingly placing a high priority on promoting more efficient use of existing and new resources. That is, they are choosing those options where undertaking activities or pursuing policy initiatives will yield clear economic benefits that exceed costs, even without having to include the uncertain benefits from the accompanying reduction of greenhouse gases and other pollutants.

The energy sector is by far the largest single contributor of greenhouse gas emissions, making measures that improve efficiency a high priority.

The major means to reduce waste of resources will come through better pricing, more efficient consumption and supply, and cleaner alternative fuels and technologies.

In most developing countries, energy prices do not cover costs, meaning that energy consumers do not face prices that encourage them to use energy efficiently.

The efficiency of energy consumption could be increased in many developing countries through the use, for example, of more efficient motors, light bulbs, refrigerators, cars and trucks, water heaters, and charcoal kilns. If the energy requirements of everything from industrial boilers to stoves to light bulbs could be lowered, it would significantly slow the growth in overall energy demand and the greenhouse gas emissions, in turn reducing the need for large new investments in energy supply.

New and evolving energy-efficient technologies are promising, and along with making certain energy prices reflect real costs, there is a need to continuously re-evaluate the economic, technical and social feasibility of their implementation.

Reviews of the performance of developing-country power utilities over a 20-year period point to a general trend in increasing inefficiency. Losses in the delivery of electricity are commonly greater than 20 percent--sometimes approaching 50 percent--and while some of this represents theft and inadequacies in metering and billing, it is clear that technical losses in networks are high.

Fortunately, the costs of reducing these high energy losses tend to be low relative to the large benefits gained. A small investment in improving efficiency in the power sector, for example, might provide as much incremental supply capacity as three to 10 times as much spent on new capacity.

One of the most promising alternative fuels is natural gas, whose carbon-dioxide emissions are much lower than those of other fossil fuels. Natural gas has been discovered in more than 50 developing countries, and proven reserves are now larger than those for oil. At the same time, its development has become increasingly attractive on economic grounds, thanks to the new low capital cost, short lead time, and high energy efficiency turbine technology.

Another alternative may well be hydropower, where there is still substantial development potential. Two advantages of this technology are its lower operating costs and the fact that hydropower stations are less complex to operate than other types of electric power stations. But there are local environmental disadvantages of hydropower projects. While a number of countries have improved their hydro-policies and practices to mitigate environmental and resettlement problems, much remains to be done.

A third prominently mentioned alternative is renewable energy source--such as biomass (plant materials and animal waste), solar and wind power--since they usually do not contribute significantly to green-

house gas emissions. Their use is economically justified in selected developing country applications.

Most of the greenhouse gases released by industry are the result of energy use, rather than specific industrial processes. Thus, most of the measures suggested for improving the efficiency of consumption in the energy sector also apply here, with the added bonus that energy-intensive industries tend to be more sensitive to price signals than small domestic consumers.

The transportation sector contributes greenhouse gases (and local air pollution) mostly through the burning of motor fuels. But with the possible exception of compressed natural gas for vehicle fleets, few available technologies have the potential to quickly ameliorate the situation. It is likely that more efficient vehicles and cleaner fuels will be developed, although at today's prices and production levels, alternative fuels are generally more costly than existing oil-based ones.

Even so, there are initiatives that should be undertaken on economic, as well as environmental grounds. Improving urban transport efficiency is particularly important. The failure to transfer the costs of scarce urban street space to vehicle users through congestion charges, vehicle registration fees, and parking fees has resulted in large and quantifiable economic costs without taking into account the negative environmental side effects.

Measures taken to improve the operation of urban transport systems--such as enforcing traffic laws, improved signalling, traffic controls, and road maintenance, or displacement of the automobile by buses--can significantly reduce the consumption of energy per mile traveled.

Another set of options involves those where the developed countries will need to take the lead. In this part of the spectrum, the costs of the action are thought to be low relative to the potential high costs that might be incurred by doing nothing--much like buying insurance.

One obvious insurance option is phasing out, or substituting for, CFCs. The need to do this is all the more urgent given that if nothing changes, developing countries are expected to sharply increase their use of CFCs, matching the present contributions of the United States and Western Europe combined by the end of the century.

Until now, CFCs have been mostly produced and consumed in a few developed countries. As a result, it should be possible for the higher-income countries to bear most of the costs of eliminating CFCs, while providing the relatively small financial incentives needed to compensate the poorer countries for incurring higher costs for non-CFC refrigerants, foam-blowing agents, aerosols and cleaning agents.

Of the other insurance options now available, research should have a high priority.

A final set of options embraces those areas where benefits are uncertain and the costs of action are so high that developing countries simply cannot be expected to take any initiatives at this time. Among these are:

· **Phasing out coal or freezing carbon dioxide emissions.** This is highly unlikely in the developing world unless the major uncertainties regarding the magnitude, timing, and distribution of any benefits are reduced and large benefits are pinpointed.

· **Large-scale reforestation programs.** Given today's fossil-fuel use and its projected growth, an enormous amount of additional land would need to be devoted to growing forests in order to significantly reduce carbon dioxide levels in the atmospheres. For example, an estimated 2.5 million hectares per year--equivalent to an area slightly less than Belgium--would have to be reforested in order to absorb just the additional carbon emitted annually by recent U.S. fossil fuel consumption. In most developing countries, economic, logistical, management, and political constraints preclude the likelihood of successfully pursuing such a large-scale and costly option. On the other hand, slowing or stopping tropical deforestation through improved land management is in many instances highly cost-effective and should be pursued vigorously.

· **Nuclear energy.** For the developing countries, nuclear power has proven to be a very expensive option--compared with other forms of electric power generation--in terms of financial costs and scarce manpower skills. In addition, governments must wrestle with troublesome security and waste-disposal issues. For most developing countries, the current generation of nuclear-power technology does not look to be a viable option at the present time.

Whether or not the future brings a significant global warming, much work in the areas of energy efficiency, fuel choice and technology development is economically justified in its own right. Indeed, efficiency issues should continue to be at the heart of developing-country energy policy formulation, institutional restructuring, and operations. The usefulness of the various options reviewed here will change as the greenhouse uncertainties are reduced, either through research or the passage of time. The international energy community must closely monitor all developments and constantly evaluate the best policy mixes.

Adapted from an article by World Bank staff members Anthony Churchill and Robert Saunders that appeared in *Finance and Development*, a quarterly published jointly by the World Bank and the International Monetary Fund. □

Stephen Lintner

Most of the greenhouse gases released by industry are the result of energy use, rather than specific industrial processes.

INFORMATION BRIEF

Energy Efficiency

Energy efficiency is not simply "conservation" with its Spartan notions of lowered thermostats and restricted driving. While influenced by such behavioral patterns, it is more fundamentally a function of macroeconomic policies, of institutions that set and monitor standards, rules and regulations, of industrial and urban structures, and of the technologies employed in buildings, factories, and transport. Energy efficiency is about getting the same, or better, services from less energy.

Energy use in developing countries over the past two decades has grown more than seven times that of the industrial countries. Over the next few decades, commercial energy consumption in the developing world will increase as dramatically. If this were not so, developing countries could not grow economically. For productivity and energy use are inextricably linked.

There are two problems attached to expanding energy resources. One is economic: to increase energy requires large investments of capital, which is scarce in developing countries. The other is environmental.

The energy sector is by far the largest single contributor--accounting for roughly half--of carbon dioxide and greenhouse gas emissions. And producing energy pollutes in other ways: it can cause acid rain and pollute surface and ground water and agricultural land; it can lead to siltation of rivers and reservoirs; flooding land for new dams can displace the people who live in the area or can lead to a loss of unique flora and fauna. Because of these problems, using energy more efficiently, rather than generating more energy, is often a high priority.

Energy in Industrial Countries

About a quarter of the world's population (those who live in industrial countries) consume three-quarters of the world's energy. As a result, small gains in efficiency in those industrial countries that consume the most have a big impact on conserving energy. Over the last 15 to 30 years, most industrial countries have not increased their energy supplies but have managed to improve the efficiency of existing supplies by between 15 percent to 30 percent. Through such efficiency measures $250 billion worth of oil, gas, coal, and nuclear power have been saved annually.

Many efficiency measures--information campaigns, free energy audits and labelling of appliances--are low-cost for industrial countries. Improving end-use equipment--more efficient refrigerators, street lighting, or motors--can often be more feasible than constructing new power plants.

Energy prices play a critical role in stimulating efficiency. Very rarely do energy prices reflect the hard-to-calculate but real costs to health, property, and the environment in industrial countries. But, in developing countries, prices often do not even reflect the real costs of producing or importing energy.

Energy in Developing Countries

While in industrial countries much of the potential savings and innovative energy conservation work is being done on the demand side--that is with energy users --in most developing countries the biggest potential for energy savings is on the supply side--with energy producers.

Overall, four factors account for the differences in the efficiency of energy production and use between industrial and developing countries. First, energy enterprises in developing countries tend to be monopolies managed by governments, whereas in industrial countries such enterprises have a more formal arms-length transparent relationship with government where rules and regulations are clearly spelled out. When government is directly responsible for energy enterprises it is politically difficult to make unpopular decisions such as raising prices.

Second, developing countries tend to price energy, particularly electricity, below what it costs to produce and distribute, while industrial countries tend to at least recover full costs and sometimes substantially more.

Third, many developing countries' industrial and large commercial sectors are dominated by a relatively few large monopoly or highly protected state enterprises. It is well documented that many protected industries in developing countries use far more energy per unit of output than do similar industries in the industrialized world.

Fourth, there is little knowledge about energy-efficient processes and technology in most developing countries. Because there are no competitive market structures and because energy prices are subsidized it is simply not profitable for firms that provide energy efficient technologies and information to go into business.

The highest priorities for developing countries aiming to increase energy efficiency are to create the institutional and regulatory framework, to set realistic prices, and to provide the conditions for a competitive market to operate. Only when the institutional and incentive structure issues are addressed can other energy-saving initiatives be started. If the energy requirements of everything from industrial boilers to stoves to light bulbs could be lowered, it would significantly slow the growth in overall energy demand.

The transport sector is important for promoting more efficient energy use in developing countries, too. Again, macroeconomic and institutional issues are initially the most important to address. Inefficiencies in transport result from distorted pricing, which leads to excessive fuel consumption and the use of outdated technology. Poorly maintained roads and under-inflated tires also lead to excessive fuel consumption. Measures taken to improve urban transport systems, such as improved signalling and traffic controls, or using buses rather than automobiles, can significantly reduce the energy required in urban areas.

In addition to these measures, the World Bank has found that alternative fuels and technologies offer potential for more efficient use of energy in many countries. □

The Search for Strategies to Reduce Carbon Emissions

The relationship between development, energy use, and global pollution--particularly greenhouse-gas emissions from hydrocarbon use--is increasingly clear. Mudassar Imran of the World Bank's International Economics Department has been looking into some strategies and options available in the search to encourage a reduction of carbon emissions in developing countries.

WBN: What is the extent of the increase in developing countries' share of emissions and how is it expected to grow?

Mr. Imran: Broadly speaking, under a business-as-usual scenario, emissions from developing countries would double by the year 2010.

In *Energy Demand in the Developing Countries*, a publication I co-authored, I prepared estimates for eight countries, including India and China, which are major users of coal. Using this analysis, we forecast that even if emissions in OECD countries are cut, total carbon emissions will still increase by about 2 billion tons over current levels of about 6 billion tons by 2005.

This means that the emissions from developing countries will contribute about 4 percent per year between 1990 and 2005.

WBN: What are developing countries doing about this problem?

Mr. Imran: Developing countries today account for 29 percent of global carbon emissions, and China alone accounts for 11 percent. The Intergovernmental Panel for Climatic Change (IPCC)--a group started in 1988 by the United Nations Environmental Program and the World Meteorological Organization to study the sources, impact and possible responses to climate change--suggest that the developing countries can't really do too much to reduce emissions at this stage because they are going through an energy-intensive industrialization process and do not have the resources to cut down emissions. But proposals have been made suggesting that a limit be put on the amount by which developing countries may be allowed to increase their emissions.

WBN: What have the industrialized countries done to cut emissions of greenhouse gases?

Mr. Imran: Under the so-called Montreal Protocol, the international community agreed to phase out chlorofluorocarbons (CFCs), and the 1988 Toronto Conference called for worldwide reduction in carbon dioxide emissions by 20 percent by the year 2005 and by 50 percent by 2050. However, some scientists are skeptical about the evidence of global warming, so instead of taking costly action to cut carbon emissions, they feel it would be better to first invest in research to improve understanding of global warming problems.

WBN: Are there factors other than rapid, energy-intensive industrialization that contribute to developing countries' greenhouse-gas emissions?

Mr. Imran: Yes, urbanization is increasing as is the rate of motorization, and many of the motorized vehicles used in developing countries are old and less efficient--at least 30 percent less efficient--than those in industrialized countries. And more and more people are switching from bicycles to motorized three-wheelers.

Prices are also a factor. For example, prices for lignite coal in Eastern Europe are far below world prices. The artificially low prices lead to careless, wasteful use of this fuel, causing increased carbon emissions. Similarly, in China, coal prices are only about 30 percent of world prices.

WBN: What can the developing countries do to reduce carbon emissions?

Mr. Imran: There is tremendous scope for efficiency improvements, but only if energy prices are set at levels that reflect the true value of energy resources. This will discourage waste. And then there are alternative forms of energy. There is a lot of scope for the use of natural gas in the developing world. Pakistan, for example, has a very sophisticated gas network. New technologies that make gas utilization easier are now available. But it is expensive to explore for and develop gas resources, to develop the infrastructure and to transport the gas.

There is also some potential in the area of coal "desulfurization." And, there is a move toward privatizing power utilities in developing countries to increase efficiency. Guaranteeing property rights over resources encourages people to use resources more efficiently. And there are renewable energy sources such as solar power, but these may not be feasible because they are more expensive than oil. But on environmental grounds, these alternatives may be justified.

WBN: What economic approaches might be used to reduce emissions in the developing countries?

Mr. Imran: Policies designed to reduce carbon emissions can be broadly categorized into "command-and-control" and "market-based" strategies.

Command-and-control strategies are mandated controls. For example, a government might tell industry that it must cut emissions by 20 percent. These types of measures can be costly because market forces are not employed to find the least-cost solution to the problem.

Market-based methods are often better. One such method that is gaining momentum is the "carbon tax." This tax is charged to polluters. Another market-based method focuses on what are known as "emission rights to trade." Here, the government agrees on how much carbon emissions should be cut and then allocates "rights to pollute" to different industries. Heavy polluters will exceed their allotted rights to pollute so they will have to buy additional rights from firms that pollute less. Firms that don't pollute very much can sell their leftover rights to generate capital. Forcing big polluters to buy rights acts as an incentive to adopt fuel-efficient and relatively "clean" technologies.

There is a lot we still don't know about these methods. But we do know that they are all costly and difficult to implement.

Editor's note: This interview was based on the report, *Developing Countries' Options for Controlling Global Pollution.* Journalists may receive complimentary copies by writing on company letterhead to the World Bank, Room T-8020, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A. □

INFORMATION BRIEF

Natural Gas in Developing Countries

Natural gas is potentially an important energy source in the developing world. Some 57 developing countries hold nearly half of the world's proven gas reserves. Gas is a more reliable energy source than oil for these countries; oil often must be imported. Gas can be a cheaper fuel than oil, and is much less harmful to the environment than either oil or coal. But natural gas remains largely untapped, because developing countries require expert advice and financial assistance to make the most of their gas resources.

Many developing countries are dependent on imported oil. During the first oil crisis in the early 1970s, their collective oil import bills quadrupled. In the face of rising energy costs, these countries needed to borrow large sums of money from abroad, and were often forced to deplete local natural resources, like fuelwood or coal, to provide their energy needs. Higher trade deficits, the debt crisis, and environmental pollution were the result.

The Benefits of Natural Gas

Clearly, new sources of energy were required, and natural gas is proving to be one of them for some countries. Natural gas is a powerful and versatile fuel. It can provide fuel for power plants as well as cooking and heating at home. Its byproducts can produce plastics and fertilizer, and it can serve as a vehicle fuel. Compressed natural gas fuels half a million vehicles around the world.

Gas is cheap compared to oil. A study of 10 countries showed that when crude oil prices are as low as $15 a barrel exploiting most of the larger onshore and some offshore gas reserves in many developing countries is readily justified.

Natural gas is also one of the cleanest sources of power other than the rays of the sun and wind power. It does not create resettlement and health problems as do some hydropower plants, nor does it cause the waste and safety problems of nuclear power. Per unit of energy, coal produces 70 percent to 90 percent more carbon dioxide than natural gas; oil emits 40 percent more. Not only do coal and oil contribute more to the buildup of greenhouse gases and the heat they trap, they also produce--as natural gas does not--sulfur dioxide and particulates that return to earth in acid rain.

High Start-Up Costs

Yet natural gas as an energy source is not problem free. Gas requires high start-up costs, new technology, sophisticated marketing methods, and institutional development. In particular, there is the high up-front cost--even after exploration and discovery--of the infrastructure needed to move the gas from the well, to process it into fuel or feedstock and then to distribute it to consumers. Those investments are likely to be economically and environmentally sound, but they are high--higher than many developing countries can manage alone. They will require financial assistance--from the World Bank, other aid institutions, and private investors.

Because of these high costs natural gas is underutilized. Developing countries currently consume less than 1 percent of the gas reserves they hold. They burn off as much as 20 percent of their production. The price of oil has also imposed a stop-and-go pattern on the growth of natural gas use. The World Bank, for example, lent about $650 million to developing countries for natural gas development in 1983 when oil was $30 per barrel. In contrast, lending fell to below $100 million in 1986 when oil was below $15 per barrel. Today, Bank lending for natural gas has risen above $1 billion.

The Energy Sector Management Assistance Programme (ESMAP), a joint World Bank-United Nations Development Programme effort, is helping to increase the use of gas in developing countries. ESMAP identifies opportunities for investing in natural gas projects and prepares gas development plans and financing packages. It also recommends appropriate policies to governments who wish to encourage natural gas development and use.

ESMAP is also helping developing countries to devise environmentally sound energy strategies, which include substituting natural gas for coal, oil, and hydro power, and helping them make the necessary institutional and policy reforms. It is also trying to stimulate private-sector involvement, including encouraging local and foreign capital markets to finance gas development.

Power Sector Prospects

Perhaps the major candidate for increased gas use in most developing countries is the power sector. Existing plants can be converted from oil or coal, and new plants built, to use gas. Apart from the environmental premium attached to gas, which is particularly important for power plants built near cities, an important argument in favor of gas is that it produces low cost electricity efficiently, particularly in combined-cycle plants which generate both heat and power. Even for small, remote gas fields in areas with potential power demand, gas-based power plants can successfully compete with other power producers, including imported diesel plants.

Despite the overwhelming economic benefits of power generation from gas, a survey of government plans for additional capacity over the years 1980-2000 finds few that give prominence to gas. Gas is neither being used nor targeted at rates near its potential. Working against gas development are four considerations: first, lack of knowledge in gas utilities in developing countries and in aid agencies; second, a conservative attitude toward unfamiliar fuels; third, the prestige factor of hydro projects; and fourth, lack of information about the environmental premium of natural gas and its wide availability.

Industry could also use more gas. Small industries such as brewing, food processing, and light manufacturing, as well as ceramics and glass, hold great potential. Smaller handicrafts and local industries such as brick kilns can benefit from natural gas use. □

Nigeria Boosts Environmental Management

Nigeria will strengthen the country's main environmental protection agencies. The International Development Association (IDA) has approved a credit of SDR 18.8 million ($25 million) to support the government's effort.

Nigeria's economic development and rapid population growth have resulted in substantial pollution and natural resource degradation. In order to confront these problems, the government established new agencies, including the Federal Environmental Protection Agency (FEPA) in 1988, and the Natural Resource Conservation Council (NRCC) in 1989.

The IDA credit will finance measures aimed at strengthening the capacity of these institutions to develop their programs, establish an environmental information system, and complete a series of studies leading to new investments targeted at conservation and the reduction of environmental degradation. The goal of the effort is to create an effective environmental program at the national and state levels by integrating environmental activities across sectors and regions.

The IDA credit includes support for an ecological fund, which provides environmental grants to government agencies, the Ministry of Budget and Planning, the Ministry of Finance, and state environmental agencies.

The environmental information network that will be set up with IDA support will monitor environmental trends across the country, using techniques such as aerial surveys and satellite imagery.

Studies will be carried out to identify specific investment projects critical for alleviating environmental degradation. The studies will cover industrial pollution, pollution in the Lagos Lagoon, hazardous waste disposal, phasing out of chlorofluorocarbons (CFCs), and issues related to national parks.

According to Jasdip Singh, principal environmental officer in the World Bank's Africa Region, "Nigeria is taking a major step towards sustainable development." With 100 million people, Nigeria has one-fourth of the total population of sub-Saharan Africa.

He adds that "the heavy strain on natural resources, on human capital, and the results of modernization and urbanization have made it difficult for Nigeria to replenish its scarce resources." Environmentally sound development is needed to make sure that "what was a forest doesn't begin to look like a desert." □

Kenya Acts to Halt Degradation of Wildlife Resources

Kenya is launching a 10-year program to conserve the country's wildlife resources. The International Development Association (IDA) has approved a credit of SDR 44.8 million ($60.5 million) to support the program.

Kenya's elephant population has declined 85 percent, from an estimated 130,000 in 1973 to 16,000 in 1989, while the rhinoceros population has declined 97 percent, from 20,000 in 1970 to 500 in 1989. The program is designed to assist the government's efforts to protect these and other animals from extinction and to get communities involved in protecting and managing parks and other areas where wildlife lives.

Approval of the IDA credit marks the first time any World Bank agency has supported a project devoted entirely to protecting wildlife.

The IDA credit will help finance improvements of parks and wildlife preserves and training and technical assistance for Kenya Wildlife Services, the government agency in charge of managing the parks and enforcing laws against poaching. The credit will also finance a nationwide education program to increase people's awareness of the importance of Kenya's wildlife.

"This is an integrated effort to protect Kenya's wildlife in the long run," according to World Bank official Owaise Saadat, who points out that the program includes plans for carrying out research and implementing policies that will provide people with incentives to participate in the effort.

"The program will not succeed if people living around the parks are not actively involved and if their concerns are not integrated into future plans for wildlife park management," Mr. Saadat says. Animals currently roam freely in and out of protected areas and commonly damage farmers' crops and sometimes even attack people, so villagers often kill animals that wander onto their land. "For many people living near parks, there have been only costs associated with wildlife protection. The people see no benefits. The program will ensure that people do benefit from wildlife protection," he says. Tourism revenues will be shared with communities that participate in anti-poaching programs, fences will be built to protect people's farms, and people will receive financial assistance to help them start up wildlife-related businesses, such as tourist facilities and small-scale handicraft shops.

Tourism revenues will also be used to build health care and education centers for communities participating in the program. Non-governmental organizations will participate in the program to ensure that people's interests are taken into account in any decisions related to wildlife management. Mr. Saadat notes that Kenya has already made impressive progress in controlling poaching. In the past, poachers killed about 5,000 elephants a year. During the last two years, a total of 52 elephants were killed. The wildlife-protection program is expected to reduce this number even further, while enabling the government to strengthen its system for tackling environmental problems in the long run. □

UN photo 154828/E. Darroch

Kenya's elephant population has declined 85 percent, from 130,000 in 1973 to 16,000 in 1989.

INFORMATION BRIEF

World Population and Development

The number of people on this planet is increasing rapidly and every additional body means greater demands for food, health care, fuel, water, and space. More people mean more pressure on the environment and more pressure on governments simply to meet minimum human and social needs, much less raise the quality of life.

It is a tough and persistent battle described by Barber Conable, president of the World Bank from 1986-1991, this way: "My sense of urgency derives from concern about the serious strains that more billions of people will impose on the earth's environment. Our lands can be made to feed our populations, but at what cost to the earth's ability to sustain the livelihood of future generations? Our cities may be able to accommodate added millions, but at what cost to the quality of urban life? Our political, social and legal institutions can be adapted to accommodate increasing population density, but at what cost to privacy, to personal freedom, to the rights of individuals."

Population Growth

The world's population in 1991 is an estimated 5.3 billion and will reach 6 billion before this decade ends—with about 95 percent of the births taking place in developing countries. Another billion people — the equivalent of the present-day population of Africa and Latin America combined—will be born in the decade after that, and the world population will reach eight billion by about 2020.

The astounding rapidity of the increase can be measured simply. It took from the beginning of human history until 1960 for the world's population to reach 3 billion people. In just three decades from 1990 to 2020 another 3 billion will be born. At current birth rates, population experts predict a total of 12.5 billion people on Earth by the end of the next century, well over twice our world population today.

But population is not a matter of numbers alone, as Mr. Conable has noted. It must be measured against the ultimate question: how many people can our fragile planet sustain. Conable said, "The whole purpose of development is to improve the quality of people's lives — increasing their options." Yet sustainable development is virtually impossible where no thought is given to the explosion of people who must share in economic growth.

Population Policy

For many years, despite the obvious burdens of additional billions of people and the questions their existence raised, resistance to family planning programs significantly outran the enthusiasm of many developing country governments to control fertility. For many developing countries, family planning was often socially and religiously troublesome; political obstacles were, therefore, great and it was generally considered beyond the state's ability to establish and maintain policies which would make a difference.

Slowly, however, resistance yielded to population realities and the obstacles, present or anticipated, diminished or disappeared. Governments increasingly found that vast numbers of people sharing too little cannot be politically ignored forever.

When ardent efforts at economic development and growth barely met the increasing needs of an expanding population, something had to be done. Family planning thus became a matter of great urgency for both developed and developing countries.

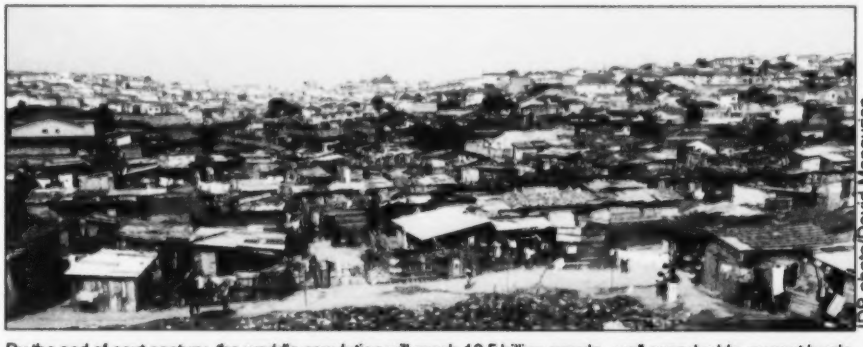
A New Commitment

As of early 1975, 49 countries with a total population of two and a half billion people had announced official policies designed to slow the rate of population growth. They had become convinced not only of the need to do so, but of the possibility of success. The conviction that it was possible to alter fertility — absent in earlier years — then grew quite rapidly. That was of vital importance to the World Bank.

The Bank's first lending in the field of family planning policy and programs was in 1970 for just $2 million, but during the following five years projects totaled $122.7 million. Balance between supply of resources and demand arrived in the latter part of the 1970s, and since then, in a significant change from a decade before, the availability of resources has fallen farther and farther behind the demand for those resources.

While trying to make more resources available, the World Bank continues to believe that the degree of emphasis placed in national policy on population planning is the responsibility of governments. The acceptance of family planning and the choice of methods are the right of parents.

The Bank does not attempt to promote detailed policies or particular methods; it recognizes that this is a field where individual, social, or national attitudes cannot be expected to change overnight — even when the will to change is present. But the Bank seeks to encourage countries which have a population problem to consider the urgency of the question, and take appropriate action. □



IDB photo/David Mangurian

By the end of next century, the world's population will reach 12.5 billion people, well over double current levels.

INFORMATION BRIEF

National Environmental Action Plans

In assisting governments to develop strategies to deal with their environmental problems, the World Bank's work in these countries is built on the environmental profiles, strategy documents, and sectoral and economic analyses that countries, other international and bilateral agencies, and non-governmental organizations (NGOs) have done themselves. Comprehensive, national environmental action plans are becoming key parts of individual countries' economic development plans.

A National Environmental Action Plan (NEAP) provides a framework for integrating environmental considerations into a nation's overall economic and social development strategy. The NEAP initiates a continuing process of environmental planning, and is intended to become a regular part of governmental decision-making.

The NEAP normally consists of a description of the country's environment, an overview of the development strategy it has followed, and how the interactions between them have contributed to the country's specific environmental concerns. The NEAP examines the causes of environmental problems and identifies the actions required to deal with priority problems, including: proposed economic policy, legislative, and other changes; investment requirements; institutional development; and education and training. It should outline the whole package of actions needed to deal with the particular set of key environmental issues and problems affecting the country.

The NEAP therefore should be designed to serve as a guide to the national government, the business and industrial community, NGOs concerned with the environment, and aid donors in formulating, implementing and funding an environmental strategy and action program for the country.

The government is responsible for preparing the NEAP. But the NEAP should also reflect the views of the business and industrial community, NGOs, local peoples, the scientific and technical community, and other interested parties.

Where individual countries cannot effectively address environmental concerns, regional studies are often required. Such an approach is useful when several countries experience similar problems and where valuable lessons can be learned through multicountry analysis. Most of the studies --and certainly all of the national environmental action plans--have been developed with the participation of the larger donor community of nations and organizations. The studies focus on identifying specific investments and policy prescriptions to address five priority environmental problems. The types of action promoted by the Bank can be summarized under the following categories:

Destruction of Natural Habitats. This issue covers a wide range of problems that have a direct effect on the viability of natural ecosystems, including the loss of diversity in animal and plant species and the destruction of scenic areas. Natural habitats are threatened primarily by indiscriminate land clearing and development of forests, wildlands, and wetlands; pollution; illegal capture and trade in endangered species; and overexploitation through hunting.

Land Degradation. Land degradation includes erosion, soil compaction, waterlogging and salinization, and nutrient depletion--all of which reduce soil productivity. This, in turn, has adverse effects both on and off the farm. Deforestation is also significant not only because of its threat to natural habitats, but also because it is perhaps the most serious cause of land degradation in developing countries and, at the same time, an important factor in global issues such as biodiversity and climate change. The many causes of deforestation include commercial logging, conversion of forest lands to urban and agricultural uses, and overexploitation of land for activities such as cattle ranching. Pasture and rangeland degradation, along with soil erosion and deforestation, is occurring in many regions as human and livestock pressures on the land increase.

Degradation and Depletion of Fresh Water Resources. In many developing countries, overuse of both surface and ground water resources is making water scarce and of poor quality. In many large coastal urban areas, polluted surface water causes local people to overdraw aquifers, which carry water to wells and springs. This, in turn, causes salinization, or increases in the amount of salt in water, particularly of the shallow groundwater on which poor people depend. Management problems are complex, and the problems of allocating water for competing uses are becoming increasingly difficult and important as supplies diminish.

Urban, Industrial, and Agricultural Pollution. Industrial effluents, which sometimes include hazardous wastes, are becoming an increasing threat to public health and natural systems in developing countries. Water resources are especially threatened. These pollutants can usually be traced to specific sources, but air pollution from automobiles in congested urban areas also creates harmful effects. The disposal of solid waste is of growing concern, too, with its threat to public health, soils, waterways, and air quality. Agricultural pollution from pesticides, herbicides, and fertilizers affects soils, water systems, and the health of workers. In the absence of effective safeguards, it may also have a direct toxic effect on food supplies.

Degradation of the "Global Commons." Many environmental problems not only disregard national boundaries, but also become concerns at the global level. Such problems include loss of biodiversity; discharge of chlorofluorocarbons (CFCs) and resultant ozone depletion; other forms of atmospheric change that create a potential for global warming; and transboundary pollution and hazardous waste disposal, particularly in bodies of water.

Resolution of many of the environmental problems highlighted in specific national environmental strategies would also contribute toward resolving these global problems and thus would provide benefits to the global community. □

World Bank Adopts New Forest Policy

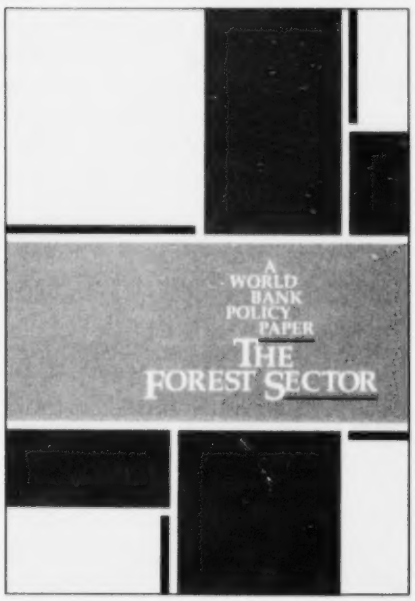
The World Bank pledged it "will not under any circumstances" finance commercial logging in primary tropical moist forests (TMFs) in its Forest Policy Paper released in Washington last summer.

The policy applies to the entire World Bank Group, which includes the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA).

In addition, the policy paper states that the financing of infrastructure projects--roads, dams, mines--which may lead to loss of primary forests (intact virgin woodlands), will be subject to the rigorous environmental assessments that the Bank conducts for projects that raise diverse and significant environmental and resettlement issues.

The policy paper is the first the Bank has issued on this subject since 1978. A substantial increase in the world's understanding of and concern about the forest sector of the developing world during the intervening 13 years prompted the updated paper.

Commenting on the long and thorough process from which the paper derived, Michel Petit, Director of the Bank's Agriculture and Rural Development Department, stressed that "it has involved a great deal of research and coordination with many organizations, including a large number of non-governmental organizations (NGOs), who have provided valuable and significant input."



Today, the rate of deforestation is running between 17 million and 20 million hectares per year (about 42 million to more than 49 million acres).

While the majority of this loss is in TMFs, tropical dry forests (TDFs) are also subjected to deforestation. Also, large areas of temperate forests, especially in Eastern Europe, are being degraded mainly because of acid rain.

The loss of the TMFs is of particular concern since they have a great influence on global climate and biological diversity. Also, they are the more fragile of the forests in that their soils are easily degraded once deforested, and even if reforestation or selective felling of trees is attempted, experience suggests that their initial ecosystems cannot be fully renewed or sustained.

Cautioning that the World Bank is but one player involved in stopping deforestation and forest degradation, Mr. Petit noted that the Bank's future involvement in the forest sector will be designed as a component of a multisectoral approach.

To relieve the fundamental pressures on the forest over the long term, the Bank through its normal mechanisms will continue to support poverty alleviation and population policies, forest zoning and regulations, changing private incentives, and making certain that careful environmental assessments precede public investments.

In its efforts directly related to the forest sector, the Bank will focus through its aid coordination, country dialogue, sector work and lending, on the following:

- International cooperation, supporting technical assistance, international forest research, and the provision of financial resources.
- Policy reform and institutional strengthening, assisting governments in identifying and rectifying market and policy failures that encourage deforestation and inhibit sustainable land use.
- Resource expansion and intensification of the production of important forest products and services by poor rural households and communities.
- Preservation of intact forest areas, supporting initiatives to expand forest areas allocated as parks and reserves and instituting effective management and enforcement in new and existing areas.

According to Mr. Petit, the Bank will pay special attention to the 20 countries which account for 85 percent of the TMFs and whose forests are seriously threatened by encroachment and destruction. These countries are Bolivia, Brazil, Colombia, Ecuador, Mexico, Peru, Venezuela, Cameroon, Central African Republic, Congo, Gabon, Cote d'Ivoire, Madagascar, Zaire, India, Indonesia, Malaysia, Myanmar, Papua New Guinea, and the Philippines.

Michel Petit

The Bank, Mr. Petit noted, has been an active participant in on-going efforts to revamp the Tropical Forestry Action Plan (TFAP) and the proposed revised goals and objectives of TFAP are consistent with the Bank's updated Forest Policy Paper.

In all countries, and for all types of forests, Bank lending operations in the forest sector will distinguish among projects which are clearly environmentally protective, for example reforestation of degraded land, or which are small-farmer oriented, and all other forest operations such as commercial plantations. The first two types will be considered on the basis of their own social, economic and environmental merits. Other forest sector operations will be conditioned on government commitment to sustainable and conservation-oriented forestry.

Mr. Petit noted that since the Bank was founded it has financed 80 projects in the forest sector with total commitments in

excess of $2.3 billion. Admitting that sometimes Bank lending has had an undesirable impact on forest resources, he said lending has grown rapidly since the 1978 Forest Policy Paper, with increasing emphasis on social forestry and, recently, environmental issues.

"But the Bank needs to coordinate its activities with those having a role in these matters," Mr. Petit said. "The international community must support developing countries in achieving their own national goals in managing forest resources and in devising financing mechanisms which facilitate incorporation of global costs and benefits from forests into incentive structures for local action.

"We must also take into account the needs of indigenous people," added Mr. Petit, "and we must work to achieve a more sustainable balance between supply and demand of wood. This requires actions to reduce the demand for fuelwood and other local wood uses, as well as actions to increase the planting and husbandry of trees." □

Horst Wagner

The loss of the tropical forests is of particular concern since they have a great influence on global climate and biological diversity.

Raising Forest Fees Encourages Conservation

Setting "proper" prices for forest products can contribute to long-term management of the developing world's forests, states a recent World Bank study. Still, many governments have paid little attention to the role of prices in forest management.

According to the study, *Forest Pricing and Concession Policies: Managing the High Forests of West and Central Africa*, charging higher fees for cutting timber can contribute to the "financial sustainability" of tropical forests, generating revenue to finance the management and protection of these areas. A key issue in forest management is setting appropriate fees for the timber cut by logging industries. "The forest industry, of course, would prefer low forest fees," say the study's authors Mikael Grut, John Gray and Nicolas Egli. "The government should seek forest fees which reflect the value of the resource."

Mikael Grut and Nicholas Egli are forestry specialists at the World Bank. John Gray is a professor of economics at the University of Manitoba, Canada.

Setting minimum fees for forest concessions is appropriate to ensure that the benefits to the country of cutting timber cover all the costs involved, the report states. These fees should include expenses such as the cost of protecting and administering forests, the costs of selling forest products, and possible environmental costs, for example, from increased soil erosion.

The authors say many forests are destroyed as a result of policies that make timber artificially abundant and discourage conservation, low concession fees that encourage acquisition and holding of concessions beyond company needs, and low forest fees that allow firms to survive even with inefficient logging practices.

"Concession policies in most West and Central African and other tropical countries accommodate the demand of commercial firms for concessions," the study says. But the problem also exists in developed countries, say the authors, who note that the United States' Forest Service has been criticized for subsidizing logging.

According to the study, forestry departments face difficulties in regulating and supervising concessions distributed throughout the country. "The concessionaires, being on the spot and generally having greater resources than the government forestry departments, will be better able to protect and improve the forests in their area, and carry out regeneration where necessary, provided a good system of incentives and inspections is in place."

The authors conclude that "the introduction of bidding for concessions would allow governments to capture more of the economic value of timber, and the resulting higher timber price would reduce the demand pressure on the forest."

Forest Pricing and Concession Policies: Managing the High Forests of West and Central Africa is priced at $7.95. Journalists may receive complimentary review copies by writing on company letterhead to the World Bank Publications Department, Marketing Unit, 1818 H Street N.W., Room T-7054, Washington, D.C., 20433, U.S.A.

Brazil Preserves Rondonia's Natural Resources

Brazil is implementing a new strategy for managing natural resources in the Amazonian state of Rondonia. The move is part of a project being supported a $167 million World Bank loan.

The project is designed to halt destruction of remaining rain forests, protect Rondonia's rich biodiversity, and prevent encroachment into areas where Amerindians live.

The project will use "agro-ecological zoning" to delineate areas where sustainable development is possible from areas that should be preserved because of the presence of poor quality soils, rich biodiversity or because these areas are habitats for indigenous peoples.

Steps will be taken to intensify agriculture in already deforested but fertile areas by promoting environmentally sound production of tree crops.

Deforestation in the state began more than two decades ago, when the government launched agricultural development and road-building programs in the Amazon region. An unanticipated surge in settlements in the region resulted in uncontrolled deforestation and encroachment into lands where Amerindians lived. More than 12 million hectares of forest were destroyed during this period.

In 1980, the government called on the World Bank to help finance the "Integrated Development Program for Northwest Brazil (Polonoroeste)," which was designed to resolve the emerging environmental problems in the Rondonia and neighboring Mato Grosso.

The Bank approved five loans in support of the program, but because of government cash shortages and other problems, key parts of the program were implemented more slowly than planned, and at one point, the World Bank suspended disbursements on its loans.

The situation improved in the second half of the 1980s, and the government even exceeded some of the program's original goals, including establishing Amerindian reserves.

According to World Bank staffmember Luis Coirolo, the current project incorporates the lessons learned by both the government and the World Bank during the past decade about the necessary ingredients for sustainable natural-resource management in ecologically fragile areas. In Rondonia, natural resource degradation was largely driven by an "inappropriate policy framework," Mr. Coirolo says. "Fiscal incentives, subsidized credit, land-titling policies and public infrastructural investment programs all conspired to encourage an unsustainable pattern of occupation in the state."

Brazil's political commitment to addressing environmental issues and its willingness to engage in a new and more collaborative relationship with communities and non-governmental organizations have grown steadily, Mr. Coirolo asserts, noting that in addition to the 4.5 million hectares of forests already set aside as reserves for indigenous people, more than 4 million hectares have been set aside in newly created and interdicted conservation areas and reserves.

But Mr. Coirolo warns that Brazil's fiscal problems, along with rural poverty, will make it difficult to rapidly resolve the problem in Rondonia.

"If you don't solve some of the problems of the population, it's romanticism to talk about environmental protection," he asserts.

But the government recognizes that the survival of the state is at stake. "The government has looked to the lessons of the past, identified the necessary ingredients for sustainable natural-resource management and development, and taken some very important strides to begin implementing a new strategy," Mr. Coirolo says. "Since 75 percent of Rondonia's humid tropical forest is still in place, there is still much left to preserve and manage well for the future." □

Pilot Program to Conserve The Brazilian Rain Forest Moves Forward

A pilot program aimed at protecting the Brazilian rain forest is now under way with support from a trust fund approved by the World Bank on March 24. The Bank will administer the Rain Forest Trust Fund, which has received $55 million in funds from the Commission of the European Communities, Canada, Germany, Italy, Japan, the United Kingdom, and the United States.

In addition to the Rain Forest Trust Fund, several countries have pledged over $200 million in grants and no-interest loans to the pilot program. These bilateral funds will begin to be disbursed later this year.

The pilot program aims to harmonize environmental objectives with improving the standard of living of the 14 million people living in the Brazilian Amazon. The program will include an estimated 13 projects. A World Bank team will go to Brazil in early May to continue preparation of three projects that involve safeguarding areas where indigenous peoples live, improving the protection of large tracts of Amazonian parks and reserves, and carrying out grass-roots "demonstration" efforts that test alternative methods of natural resource management.

The pilot program is a response to requests by the Group of Seven industrialized countries at their Summit meetings in Houston in 1990 and London in 1991.

The group asked the World Bank and the Commission of the European Communities to cooperate with the government of Brazil in formulating the pilot program and coordinating the funding. An average of 10 percent of project costs will be covered by the Brazilian government.

The pilot program aims to test the concept of "sustainable development," which harmonizes economic and environmental objectives.

Deforestation in Rondonia: Some Background

The construction of a 1,500-kilometer highway opened up the 243,000 square-kilometer state of Rondonia for settlement in 1969.

This part of Western Amazonia, which had been a rich rubber-producing area in the boom years at the turn of the century, became an important source of cassiterite (tin) and gold in the mid-1950s.

Until the latter half of the 1960s, however, Rondonia, like most other parts of Amazonia, was virtually inaccessible by land. In 1960, Rondonia's population numbered only 70,000, and practically all of the rain forest, which covered most of the state, was still intact.

The completion of the highway was followed by a wave of migration. The migratory flow to Rondonia, which had averaged perhaps 3,000 per year in the 1960s, increased tenfold in the ensuing decade as migrants, land grabbers and adventurers flocked to the area seeking plots of fertile land that were purportedly free for the asking.

Rondonia's rapid population growth and uncontrolled settlement began to have devastating effects on the rain forest. Most of the deforestation was the result of clearing for agricultural purposes in official settlement projects along the main highway.

A network of feeder roads, which increased more than fivefold between 1975 and 1980, greatly facilitated the deforestation. Moreover, the poor condition of these roads and of the main highway, especially during the rainy season, made it difficult to transport commodities to market and thus, along with other factors, discouraged the cultivation of tree crops, such as cocoa, coffee and rubber.

From an environmental standpoint, tree crops are strongly preferred over annuals and pasture because of their superior ability to protect fragile soils from erosion. They also have important socioeconomic advantages: their cultivation is labor-intensive, and under reasonable market conditions, they can provide a decent standard of living for a farm family.

Growing socioeconomic problems in Rondonia led the government to reconstruct and pave the highway as part of a larger program of integrated regional development. The overall program, which covered the northwest region of Brazil—a 410,000-square-kilometer area that includes all of Rondonia and part of western Mato Grosso—became officially known as the Northwest Brazil Integrated Development Program, or Polonoroeste, in 1981. Budgeted at $1.5 billion, about a third of which was eventually provided by the World Bank, Polonoroeste was expected to benefit the 30,000 or so families already settled in the Northwest as well as 15,000 families waiting to be settled in Rondonia.

A principal objective of Polonoroeste was to reduce clearing of forests but several factors undermined the government's ability to achieve this goal. A major cause of deforestation was the substantial jump in migration to the state. But population growth alone can explain neither the extremely rapid pace of deforestation nor farmers' preference for shifting cultivation and production of annual crops.

The intensification of smallholder agriculture envisaged under Polonoroeste was predicated on the assumption that credit would be made available to finance purchases of modern agricultural inputs. But early in the implementation of the program, austerity measures forced a reduction in the supply of credit for small farmers. At the same time, subsidized credit and fiscal incentives encouraged large-scale ranching and timber harvesting. Meanwhile, speculators generally preferred to keep their land in pasture because the maintenance costs are lower than for crops.

In addition, certain land and tax policies that were in effect in the late 1980s encouraged unnecessary deforestation and inappropriate land use. Foremost among these was acceptance by Brazil's National Institute for Colonization and Agrarian Reform of deforestation as evidence of "land improvement;" a migrant in one of the government's official settlement projects or an invaded area could obtain rights of possession simply by clearing the forest. Both good and poor lands were deforested indiscriminately as a result.

This background note was adapted from a 1989 World Bank report, *Government Policies and Deforestation in Brazil's Amazon Region*, by Dennis Mahar. □

Haiti Moves to Halt Destruction of Few Remaining Forests

Haiti, already stripped of most of its forests, is taking action to stop deforestation through a project being supported by a credit of SDR 19.7 million ($26.1 million) from the International Development Association (IDA).

The project includes measures to protect a 17,500-hectare pine forest reserve in the southeastern part of the country and other measures aimed at increasing the supply of fuelwood, reducing the use of charcoal, and protecting national parks. The project will help increase the size of wooded areas and control soil erosion.

According to Ewald Goetz, a senior agricultural economist in the World Bank's Latin America and Caribbean region, Haiti was heavily forested only one generation ago, but "the pressure to expand crop cultivation and to provide fuelwood has depleted Haiti's once abundant forests to a remnant."

A scarcity of employment and income opportunities has caused many people to clear land for farming and grazing and to cut down trees to produce charcoal for cooking fuel.

Also, previous governments had encouraged the production of annual crops instead of tree crops, such as coffee and fruit, which would help control soil erosion in this mostly mountainous country.

To hold back the tide of environmental destruction, the government will provide incentives to farmers to plant trees and protect wooded areas. About 16,000 farmers living around forest reserves and national parks will have access to "agroforestry" extension services provided by non-governmental organizations. The government will guarantee long-term land leases to farmers to encourage them to plant and protect trees.

In addition, staff of Haiti's forest-protection agencies will receive training and technical assistance, and rangers will be hired to patrol forest reserves and national parks. The project includes a plan for promoting the use of fuel-efficient charcoal stoves to reduce charcoal use in the country by 10 percent. □

Villagers Help Protect India's Forests

Communities will play a central role in a project designed to preserve forests in India's West Bengal state. The International Development Association approved a credit of SDR 24.4 million ($34 million) on March 17 in support of the project.

Only about 12,000 square kilometers, or 13 percent of West Bengal, is covered by forests, and most wooded areas are badly degraded. Heavy demand for fuelwood is the main cause of deforestation in the state.

The project is expected to prevent further degradation and regenerate forests throughout the state, while increasing production of fuelwood for villagers.

West Bengal's forestry department will contact communities to seek their help in protecting, planting or managing forests. Participating "village forest protection committees" will be put in charge of protecting wooded areas. In exchange, communities will receive 25 percent of the profits from timber harvests and will be entitled to gather herbs, some wild foods, firewood from fallen trees and branches, and other forest products for their own use and sale.

Protecting, planting or managing the forests will also create the equivalent of close to 100,000 one-year jobs, mostly for people living in abject poverty.

The state's government began experimenting with this sort of arrangement about two decades ago and found that communities are willing to protect the forests if the benefits are sufficient and clear. "The system works," says Ann Clark, World Bank economist in charge of the project. "What started out as an experiment in only about 10 communities in one small part of the state has evolved into a system of about 2,000 forest protection committees covering almost 250,000 hectares of forests in the southwestern part of West Bengal."

Almost 300,000 hectares of wooded areas will be protected or regenerated as a result of the project.

The project will help the government increase the number of village forest protection committees and will make the system more effective by ensuring that forestry department officials are well trained, she adds.

Almost 300,000 hectares of wooded areas will be protected or regenerated as a result of the project, which is expected to benefit about 400,000 households by increasing the supply of fuelwood and creating income-earning opportunities for the poor.

"Women will reap major benefits from the project," Ms. Clark says. "Women are the predominant collectors of fuelwood, fodder, and non-wood forest products." She adds that forest products have many uses. Leaves from coppiced sal trees, for example, can be stitched together into plates and sold.

West Bengal has five major ecological areas, each with a different type of forest. The project will be tailored to each of these zones. "The project is not a blueprint for forest-protection efforts in all parts of India, but it is a model that can be adapted to local conditions," Ms. Clark says. "Unless protection of West Bengal's forest areas is firmly in place, degradation is likely to continue unabated," she concludes. □

Tanzania Will Use Satellite Photography To Monitor Deforestation

Tanzania is launching a project to stop rapid deforestation in some areas of the country by strengthening the institutions in charge of managing the country's forests and woodlands. The International Development Association (IDA) is supporting the project with a credit of SDR 13.2 million ($18.3 million).

Forests cover nearly half of the country, but deforestation is advancing rapidly in some regions, posing a threat to the subsistence of local people, who depend on the woodlands for many of their needs, and to timber production and fragile ecosystems.

Measures supported by the project include preparing maps that show forests, agricultural areas, grazing lands and settlements, and establishing a National Resource Information Center (NRIC) to coordinate the collection of information on resources, land use and environmental conditions in the country.

"Right now, the extent of Tanzania's forest resources can only be guessed at," says World Bank official Daniel Cotlear. The mapping program, which will use satellite photography to identify forests according to their type and density, will help set up the information base needed to effectively manage the country's natural resources, says Mr. Cotlear, who is managing the project for the Bank.

The project also supports measures to improve land tenure policies to give villages greater control over public lands. In the Mwanza and Tabora regions, the project will help improve management of some 450,000 hectares of forests by providing more effective extension services and improving revenue collection.

Until recently, the government has controlled forest reserves. The project includes a major change in this policy by granting communities more control over local forests. Evidence from Tanzania and other African countries shows that placing land under village government jurisdiction allows villagers to profitably manage local resources, while preventing overharvesting of forests.

Recent satellite photographs have shown that deforestation is most severe around cities and towns where fuelwood harvests are heaviest. The government and communities can limit excessive harvests and boost revenues earned from forest products by increasing prices for some products and ensuring that loggers pay for the trees they cut.

New Approach to Conservation Requires Community Support

Outlook for Biodiversity Is Bleak Without Groups' Help

Preserving the planet's biodiversity requires more than just setting up national parks or establishing protected wilderness areas, according to a new study published jointly by the World Bank, the World Wildlife Fund and the U.S. Agency for International Development.

Protecting nature will instead require governments and international development agencies to actively seek the participation of people living near parks and preserves, states the study, *People and Parks: Linking Protected Area Management with Local Communities.*

Conservation requires a perspective that stretches well beyond park boundaries and involves national policies and programs affecting rural communities.

Parks and protected areas have been the traditional approach to conservation, but many protected areas are rapidly becoming "islands" as the wildlands around them are converted to alternative, often incompatible, uses, the study warns.

"In the face of relentless human pressures, enforcement alone will not preserve these areas. Conservation thus requires a perspective that stretches well beyond park boundaries and involves national policies as well as programs affecting rural communities."

The study says that during the past decade, governments and international agencies have begun supporting a new approach toward management of protected areas that integrates the needs of local people while conserving natural resources. This approach focuses on so-called integrated conservation development projects (ICDPs).

"Efforts to promote social and economic development among communities adjacent to protected area boundaries represent the central concern of the ICDP approach...," the study says. ICDPs commonly provide people living near protected areas with incentives to participate in conservation programs and improve the living standards in nearby communities.

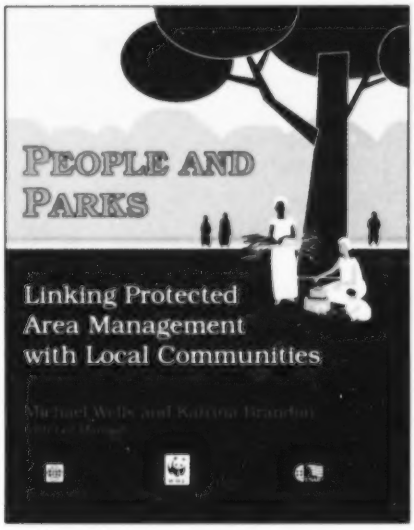
The study says that communities adjacent to protected areas too often bear substantial costs—such as the loss of access to land—while receiving little in return. "Local residents, who tend to be poor and receive few government services, often perceive protected areas as restricting their ability to earn a living," the study asserts. "It is not surprising that the pressures of growing populations and unsustainable land-use practices outside protected area boundaries frequently lead to illegal and destructive encroachment."

The study looked at 23 ICDPs in Africa, Asia and Latin America and found that the more successful projects had a clear link between economic development efforts and conservation programs.

The study also found that ICDPs cannot address some of the underlying threats to biological diversity. "Many of the factors leading to the erosion of biodiversity and the degradation of protected natural ecosystems in developing countries originate far from park boundaries," the study says.

"Among them are public ownership of extensive areas of land unmatched by the capacity of government agencies to manage these lands; powerful financial incentives encouraging overexploitation of timber, wildlife, grazing lands, and crop fields; an absence of linkages between the needs of conservation and the factors of encouraging development; and laws, policies, social changes, and economic forces over which poor people in remote rural areas have no influence."

Local residents, who tend to be poor and receive few government services, often perceive protected areas as restricting their ability to earn a living.



The study adds that even under the best of conditions, ICDPs that are centered on protected areas and directed to local populations "can only play a modest role in mitigating the powerful forces causing environmental degradation."

Still, innovative, well-designed ICDPs do play a role in conservation. But in order for this role to be significant, decisive actions need to be taken by governments, non-governmental organizations and development agencies.

"Without deliberate and concerted actions by these groups, the outlook for biodiversity will be bleak."

But the challenge for the future is not just to design and implement more effective ICDPs, the study concludes. The greater challenge will be to "engage individuals and organizations that have the capacity and the commitment to establish social, economic, legal, and institutional environments that facilitate rather than frustrate achievement of the ICDP goal of conserving biodiversity."

People and Parks: Linking Protected Area Management with Local Communities is priced at $10.95. Journalists may receive complimentary review copies by writing on company letterhead to the World Bank Publications Department, Marketing Unit, Room T-7054, Washington, D.C. 20433, U.S.A. □

Some Irrigation Networks Take Heavy Toll On the Environment

Imprudently developed, badly designed and poorly managed irrigation systems have had substantial negative effects on the environment, according to Shawki Barghouti and Guy LeMoigne of the World Bank's Agriculture and Rural Development Department.

Irrigation projects modify the environment by reshaping land and changing its "hydrological regime," sometimes with harmful side effects, say the authors in an article published in *Finance and Development*, a quarterly of the World Bank and the International Monetary Fund.

The construction of dams and irrigation-channel networks provides water for irrigation and power but it also affects soil moisture, changes the depth of the groundwater, and alters water quality. The authors say that some of these effects show up in even the best-managed irrigation schemes in ways that scientists are only now beginning to understand.

Many irrigation projects built in the past 25 years appeared to be economically attractive only because they did not include expensive "subcomponents," such as proper drainage, the authors say. "It did not take long, however, before such 'savings' produced costly results." Lack of adequate drainage systems was the main cause of environmental deterioration and declining agricultural yields in the Indus Basin in Pakistan, Egypt's Nile Delta, and the San Joaquin Valley in the western United States.

Studies of agricultural areas in a number of countries show that irrigated lands are becoming less productive because inadequate drainage and poor water management have led to increasing salinity and waterlogging of the soil. "Productivity on about 25 million hectares of the world's irrigated land is seriously affected by these problems, and the salinization of fertile croplands is running between 1 million and 1.5 million hectares a year," say the authors.

The environmental damage around the Aral Sea in Soviet Central Asia is a good illustration of the harmful effects of ill-planned irrigation on the environment, the authors say. Water from two rivers feeding the Aral Sea was diverted to irrigate about 7 million hectares of land. The 1,450 kilometer Karakoum Canal was build to transfer large amounts of water from these rivers toward the Caspian Sea to help develop agriculture in the dry republic of Turkmenistan.

Because of the large-scale water transfer, the Aral Sea has begun to die, as water volume has fallen to one-third of what it was in 1960. While the Aral Sea has sharply diminished in size, its once fresh water has become increasingly saline, threatening the livelihood of thousands of people who depend on it for fishing, water supplies, and transportation. Vast salty flatlands remain as the sea pulls back. Strong winds deposit this salty residue on prime agricultural land, not only in the vicinity of the sea, but also as far away as Afghanistan, causing severe ecological damage.

Up to the early 1970s, environmental costs were hardly considered in the design of irrigation systems, the authors say. Irrigation schemes were viewed as highly effective means of transforming traditional agricultural systems into commercially oriented and scientifically based productive enterprises.

It was not until the early 1970s that the trade-offs between relieving today's poverty and hunger through massive manipulation of the water cycle and its natural systems and the environmental and ecological costs of the manipulation came under scrutiny.

As large-scale irrigation schemes failed to protect and enhance the environment, development analysts became increasingly skeptical of the belief that irrigation and drainage projects could be justified solely on the grounds that they resulted in increased production of food and electricity, better control of flooding, and improved water services to the world's growing population, especially in rural areas.

Government policies for water use buttressed criticism of some irrigation schemes. For example, prices for irrigation services in some developing countries are so low that people have no incentive to make efficient use of water resources.

Poorly planned irrigation networks have

Irrigated lands are becoming less productive because inadequate drainage and poor water management have led to increasing salinity and waterlogging of the soil.

led to a number of other serious problems, the authors say. Water that stagnates in irrigation canals can be a breeding ground for parasites that cause sometimes-fatal illnesses, such as malaria, yellow fever, and Bilharzia.

Bilharzia, also known as schistosomiasis, is characterized by disorders of the bladder, lungs or central nervous system and affects physical growth and endurance. This illness has reduced labor productivity in China, Egypt, Sudan and Tanzania. In Egypt, productivity dropped as much as 35 percent among infected groups.

The authors say that the world's population is expected to grow from about 5 billion today to at least 8 billion by the year 2015. To feed all these people, agricultural yields will have to grow about 2 percent a year overall, with a 3 percent annual increase in food production on irrigated land.

About $250 billion has already been invested in irrigation systems around the world, and another $100 billion will be invested by the year 2000, so the environmental and other costs associated with these projects need to be clearly identified and weighed carefully.

"Because of emerging concerns, the costs of supplying water--the key input in the production of major cereals--may become greater than the value of the crops and services it provides," the authors assert. "This is the basis of the so-called emerging water-problems crisis."

To forestall the crisis, the international community must put in place a plan for water management that views human intervention in the "hydrological cycle" not as an isolated activity, but rather in terms of the intervention's consequences throughout the system.

"The water sector must be seen as part of the whole economy and as part of the national and regional environment," Barghouti and LeMoigne conclude. Reallocation of water resources, whether made by custom, law, regulation, or the market, is becoming increasingly difficult, they add. "In many instances, market forces alone cannot be counted on to produce optimal allocation. A well-articulated water-investment strategy is needed in most countries to provide a framework for analyzing the environmental and other implications of human interventions in the hydrological cycle in the long run." □

Economic Reforms Can Help Prevent Environmental Destruction

Environmental degradation is widespread because the costs of environmental damage are lower for polluters than for society as a whole, according to Visvanathan Rajagopalan, World Bank Vice President for Sector and Operations Policy.

Individual polluters have insufficient incentive to stop harming the environment. Mr. Rajagopalan added. "The fertilizers and irrigation which raise crop yields for one farmer can pollute a village's water and increase soil salinity for other farmers," the World Bank official said.

Speaking at the Developing Countries' Ministerial Conference on Environment and Development in Beijing, June 18-19, 1991, Mr. Rajagopalan said that "For a very long time, economics has generally taken nature for granted and has even been an instrument of human dominion over nature. More recently, that view has been tempered by the recognition that ecological systems have their own logic. Thus, market forces might eventually increase costs sufficiently to deter further pollution."

But nature and the market do not necessarily work at the same pace and irreversible damage can be inflicted in the meantime, he warned.

"The costs of remedial action can be far higher than the cost of preventive action, as we see may be possible with global warming."

Soundly based interventions are needed to protect the environment, but intervention can fail just as the market has failed, he cautioned. The World Bank estimates that coal was so heavily subsidized in Poland that it was used inefficiently and the cost of lower productivity caused by ill-health from foul air was perhaps 1.5 percent of Poland's gross domestic product during the 1980s. "Energy for heating greenhouses was so cheap that Poland became an exporter of tropical flowers," he said.

Mr. Rajagopalan said prices should encourage more efficient resource use. Macroeconomic policy which keeps prices as undistorted as possible is fundamental to good environment policy. Poland is raising coal prices sixfold to bring them more into line with international prices, he noted.

Developing countries need better technology for environmental protection, Mr. Rajagopalan said. But technology is transferred in equipment, and industrial countries will more readily transfer technology if they have more freedom to invest in developing countries.

Visvanathan Rajagopalan

Mr. Rajagopalan said that the evidence is overwhelming that sound environmental protection is an investment, not a cost. But environmental protection involves more than saving whales or forests, even though these measures have intrinsic merit, he said. "The issue is whether our children and their children will inhabit a planet whose environment can support rising living standards and rising population."

He called on industrial countries to "modify their claims on the world's resources and to abandon the assumption that conventionally defined living standards can rise without limit." And he said that "developing countries can no longer afford to dismiss environmental concern as a luxury."

He noted that industrial countries produce about two-thirds of global carbon dioxide emissions and 80 percent of chlorofluorocarbons (CFCs), and he stressed that these countries "have a moral obligation to reduce emissions and to help developing countries with the consequences of global warming and ozone depletion."

"Economic growth is indispensable to reducing global poverty in the long term. Growth also tends to raise environmental expectations and to generate resources for investment," he said.

But, international cooperation to tackle environmental problems is essential, Mr. Rajagopalan said, partly because no single group is likely to accumulate sufficient knowledge to be able to overcome global environmental difficulties by itself. □

Advisory Group Places Environmental Issues High on World Bank Agenda

A committee that advises the World Bank and the International Monetary Fund on key development issues said in a statement in Washington April 28 that it agreed with the conclusion of the World Bank's forthcoming *World Development Report 1992*: continued--and even accelerated--economic growth and human development can be consistent with improving environmental conditions.

The Development Committee has 22 members and meets twice a year. Its members are generally ministers of finance who are appointed for two years.

But the committee said that meeting the goals spelled out in the World Development Report will require "significant policy, program, and institutional changes in dealing with national and global environmental problems."

The developing countries will need to pursue a three-part strategy in tackling environmental problems, the committee said. First, the "mutually reinforcing roles" of sustainable development and environmental protection "must be vigorously exploited through sound macroeconomic policies that will promote growth and reduce poverty," the committee added. "The fight against poverty helps to preserve the environment."

Second, developing countries need to implement policies that discourage waste and overuse of natural resources.

And third, people and institutions in developing countries must be provided with incentives to engage in activities that are less damaging to the environment.

The committee noted that "many developing countries will continue to need increased outside help to tackle these national environmental problems." Support should be provided through existing development institutions, and existing lenders and donors can help by increasing aid, some of which should be on concessional terms. The committee agreed that the international community should consider providing an "earth increment" to the next replenishment of the lending base of the International Development Association, the World Bank's concessionary-lending affiliate.

The fight against poverty helps to preserve the environment.

Many environmental problems transcend national boundaries, the committee pointed out, and these problems require internationally negotiated solutions. "In the absence of conclusive scientific proof, a precautionary strategy to address the risk of climate change" requires a broad international consensus.

The Global Environment Facility should play a leading role as a multilateral provider of funds to countries that are confronting environmental problems that extend beyond their boundaries. □

Development and the Environment: Integrating Programs and Funding

At a meeting in Paris January 27-28 to discuss plans to replenish the lending base of the International Development Association, government officials discussed the role that the institution could play in tackling national and global environmental problems and how environmental actions should be funded. The following are excerpts from a paper presented at the meeting.

The Issues

The past five to ten years have seen an upsurge in public awareness of the costs of environmental degradation. This topic first came to public attention in the 1960s, but the focus at that time was on the immediate impact of pollution on the quality of life. While this is still an important issue, the recent attention reflects careful analysis of the longer term implications of the deterioration of air and water quality and the depletion of natural resources.

For the developing countries it is evident that protection of the environment is an intrinsic part of the sustainability of the development process. Rapidly growing populations have put pressure on the availability and quality of water, soils and forest. The need for careful management is now accepted and development programs are being redesigned so as to factor in environmental considerations.

Many forms of environmental degradation also have an impact on the global environment. Deforestation is a serious threat to biodiversity and removes important carbon sinks; CFCs and halons destroy the ozone layer; carbon emissions are major contributors to the threat of global warming; coastal pollution affects marine life.

While sound national environmental policies are invariably sound global policies as well, in a number of cases additional action is needed to protect the global environment.

The atmospheric pollution problem at the global level is in large measure due to the high levels of pollutants released by the industrial countries, yet for the future the industrialization process in the developing countries represents a major potential threat.

The biodiversity problem is the alarming rate at which biodiversity in the developing world is being reduced. In view of this, the industrial countries have accepted that there is a need to assist the developing world to meet the incremental costs of preventing further deterioration of the global environment. The mechanisms which have been set up and are evolving for this

purpose are discussed below.

This is only a partial answer to the problem of meeting the costs of environmentally sustainable development. It is now apparent that these costs are higher than was previously thought. If we add these costs to existing development programs - for example, the need to control pollution in the power sector, to protect water supplies, to prevent deforestation, to avoid soil erosion, to protect coastal zones -- this constitutes a substantial additional bill. It is very difficult to tabulate these extra needs.

These environmental costs are closely bound up with the way in which policies and projects are designed and implemented. In many (though not all) cases, the required changes raise the costs of investment. The implication of this for developing countries is that the costs per unit of output on a sustainable basis are greater than was previously thought. In the long run there is little doubt that, what the latest *World Development Report* call environmentally responsible development, is less expensive than ignoring environmental costs. The experience of the countries of Eastern Europe is graphic testimony to this.

With real official development assistance (ODA) levels rising very slowly during much of the 1980s, and declining in per capita terms, the developing countries face great difficulties in meeting these costs. The response of industrial country donors has not been to increase overall aid flows, but to direct the existing flows to activities which focus on or encompass good environmental practices and policies.

Developing countries understand the motivation for this and few would wish to return to the unreality of programs which ignore environmental considerations. Nevertheless, there is understandable resentment about being unable to direct resources into priority sectors or regions and having to set aside some activities with high returns in the short or medium term because of constraints on overall resource flows. Where additional resource flows have been made available these have mainly been for the incremental costs of protecting the global environment, and not to help developing countries handle the enlarged program implications of meeting domestic environmental costs.

The debate has often been framed in terms of the choice between funding "development" and funding the "environment". The real issue is surely the need for additional funding for environmentally responsible development. Decisions on this issue are coming to a head in a matter of weeks with the firming up of approaches to future funding through the United Nations Conference on Environment and Development (UNCED) which is due to take place in Rio de Janeiro this June.

The Changing Programs of Aid Agencies and Donors

All development programs and activities have environmental implications to a greater or lesser extent. Environmentally responsible development is a way of carrying out development programs, not a clearly identifiable set of activities. In order to identify the incremental costs and benefits of environmental protection we would always need two designs for a program or project--one which valued environmental costs or benefits at zero and one which used actual costs.

Even then we would have difficulties, since it is impossible to value some of the non-economic benefits of protecting biodiversity and preventing climate change for example. Over the past five years most donors and lenders have taken steps to help recipient countries incorporate environmental costs and benefits more systematically into their investment programs.

As the lending multilateral donor for the low-income developing countries, IDA has moved rapidly to integrate its development lending with the need of its borrowers to protect their environment.

The reasons for this are implicit in the discussion above, but merit re-stating. First, our own analysis confirms that over time, not only is there no conflict between development and the environment, but that sustainability of the development process requires good environmental policies.

Second, there is an especially close link between poverty alleviation -- IDA's central objective -- and protection of the environment. In the long run, the most effective way to stop deforestation for example is to create more income earning opportunities for local populations.

Third, the pressure on developing countries to adopt environmental protection measures had led to fears that they are being asked to trade off too much of their near term economic growth given limited resource inflows. IDA is well placed to assist countries in designing and securing funding for programs which balance the need for sustainability with an acceptable medium-term growth strategy.

Fourth, attitudes in the donor countries have shifted to reflect growing public concern about this issue. The maintenance of donor support has required firm action by IDA to respond to this concern.

IDA's programs have evolved in a number of ways:

- In order to ensure that environmental objectives are integrated into development programs, IDA is supporting the preparation of Environmental Action Plan (EAPs) for all IDA recipients.
- The links between environmental management, natural resource use and poverty alleviation are being systematically explored through IDA's country strategy and economic and sector work.
- The design of IDA's projects now reflect the costs of pollution and environmental degradation and the benefits of clean-up and protection. Environmental considerations are also increasingly being factored into the design of sector programs. This is especially important at the policy level where IDA's support for pricing energy to reflect its opportunity cost, for example, has been a major contributor to improved efficiency of energy use.
- Another important feature of these changes is the growth of financing which is targeted to support environmental objectives. In many cases these free-standing environmental projects support the programs and strengthen the capacity of fledgling environment ministries in developing countries. In addition these projects help in reshaping the policy framework so as to provide support for programs in other sectors.
- IDA has developed new operation approaches to dealing with environmental concerns. The staff specifically involved with the environment has been rapidly increased. IDA has begun to assist governments to undertake screening of all projects to assess their potential environmental impacts. The need for grass roots involvement in many environmental projects has

been recognized through an expanded role for NGOs.

- At the regional level, a number of initiatives have been undertaken. The main one is the support of the regional seas program. In concert with UNDP, UNEP and a number of bilateral donors, that has started with the Mediterranean region through a special collaborative program.
- For projects which are important for the global environment but which do not yield sufficient returns to the country concerned, donors have stepped forward to provide funding of incremental costs through the Global Environment Facility.

In aggregate this program represents a major reorientation of IDA's efforts, comparable in scope to the adoption of adjustment programs and the support for adjustment in the early 1980s'. Other donors are looking to IDA to provide the coordination and leadership in this field in a similar fashion to the role it has played in adjustment support.

Similar changes have taken place in many other multilateral and bilateral agencies. As a consequence there are already a variety of mechanisms available for funding environmental programs and others are under consideration.

As far as funding **national** environmental programs is concerned there is considerable assistance available from bilateral sources and also other multilaterals, such as UNDP for technical assistance and some of the regional Development Banks. In addition there has been private funding available from non-governmental organizations.

As far as the **global** environment is concerned, in addition to the GEF, there is the funding made available for the Montreal Protocol to protect the ozone layer.

NGOs have also played a role in funding biodiversity protection. An important initiative which cuts across the national/global dichotomy is the support for the Brazil Rainforest Trust Fund (RFT).

Integration of Development and Environment

The dialogue between industrial and developing countries on how to proceed has been taken up in a number of fora, most notably in the Preparatory Committees for UNCED. There as been considerable debate in the Preparatory Committees between industrial and developing countries about whether additional funding should be provided and if so, how much; whether these funds should be available for both global and domestic programs; and how such funds might be channelled to developing countries?

There is little question that additional resources are needed and could be efficiently used in support of environmentally sustainable development programs. The donor governments will need to assess the priority associated with this incremental funding relative to many other competing demands. If decisions are made to proceed with some funding in the UNCED context the following broad principles need to be adhered to:

- **Programs for development and environmental protection at the national and global levels should be linked operationally to ensure that consistent approaches are adopted.** This argues strongly that environmental programs should be implemented by development institutions such as the World Bank group, the Regional Development Banks, UNDP and bilateral aid programs. These institutions will, of course need to collaborate closely with environment-specific agencies such as UNEP and the individual convention secretariats to ensure effective programs.
- **The distinction at the funding level between national and global environmental support should be maintained.** While there are difficult problems of definition given the operational links, it is desirable that funding for the global environment be seen to be additional. The additionality is important both in industrial countries--where global programs draw support from constituencies which are often quite different from those which support development--and in developing countries--where additionality of global programs is the key to any agreement to participate in these programs. If the GEF were simply merged into existing development funding mechanisms it is unlikely that it would retain the support of donors and recipients. Similarly funding for the global environment conventions, whether channelled directly or through the GEF, will be targeted to specific purposes and donors will want to see links between the purposes for which the funds are provided and their use.
- **New concessional funding, additional to current development flows, should be made available to low-income countries.** New concessional funding for IDA-eligible countries should not be a relabeling of existing flows. Additionality can be demonstrated by supplementing the amounts required to maintain the real levels of replenishment of IDA and other multilateral soft loan windows.
- **New concessional funding for middle-income countries should be explored once the additional needs of the low-income countries have been met.** It would be inexcusable if concessional funding for middle-income countries was to be provided at the expense of existing programs and particularly the multilateral soft loan replenishment which assist the poorest countries. Indeed the first priority of new resources should be the additional needs of the low- income countries. If, after providing for these, donors decide to provide additional concessional funding for middle-income countries then special trust funds could be established for this purpose, to be channeled through the development agency.

A number of conclusions emerge clearly from the above discussion. There is a need for additional concessional resources under IDA-10 to help low-income countries to integrate environmental objectives into their development programs and to implement their Environmental Action Plans.

The GEF provides complementary funding to address global issues and should continue to be the channel for funds which are targeted to meeting the incremental costs of global programs. The availability of concessional funding for middle-income countries and the appropriate modalities should be explored, once other concessional funding needs have been met.

The developing countries face a very difficult situation as they take on additional tasks. Additional funding is needed to achieve the necessary momentum of environmental programs and to retain developing country support. The donor community needs to ensure that developing countries are not faced with more difficult tradeoffs and that there is a constructive dialogue of industrial and developing countries and progress towards a shared goal. □